Engineering Library

# DIESEL PROGRESS

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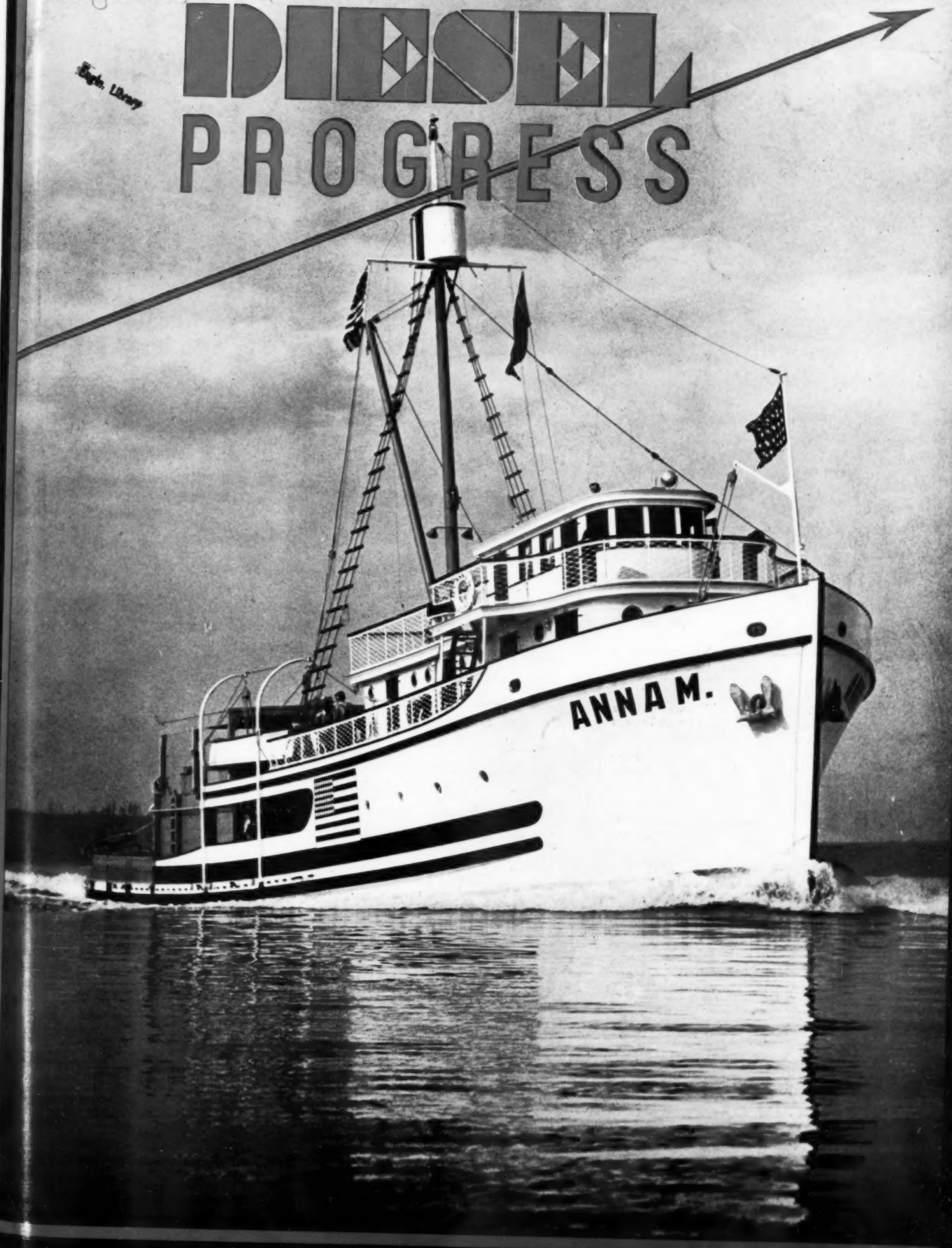
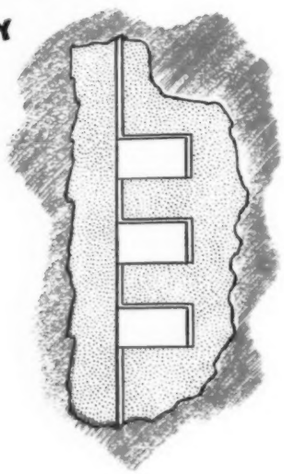



NOVEMBER, 1941

# GOOD-BYE TO BLOW-BY *in your Diesels*

Unretouched photo of piston exactly as it appeared when pulled for annual inspection.



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**REX W. WADMAN**
***Editor and Publisher***

FRONT COVER ILLUSTRATION: The new Tuna Clipper "Anna M.", recently built at the Western Boatbuilding Company's Tacoma plant, is powered with an 8 cylinder, 525 hp. Enterprise Diesel engine. See article on pages 40 and 41 of this issue for complete details.

TABLE OF CONTENTS ILLUSTRATION: This shows the launching in the Bremerton (Puget Sound) Navy Yard of the two steel Diesel seaplane tenders "Biscayne" and "Barnegat", both of which have quadruple screw, 6,000 hp. Diesel-Electric drive.

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**HEYWORTH CAMPBELL**
***Art Director***

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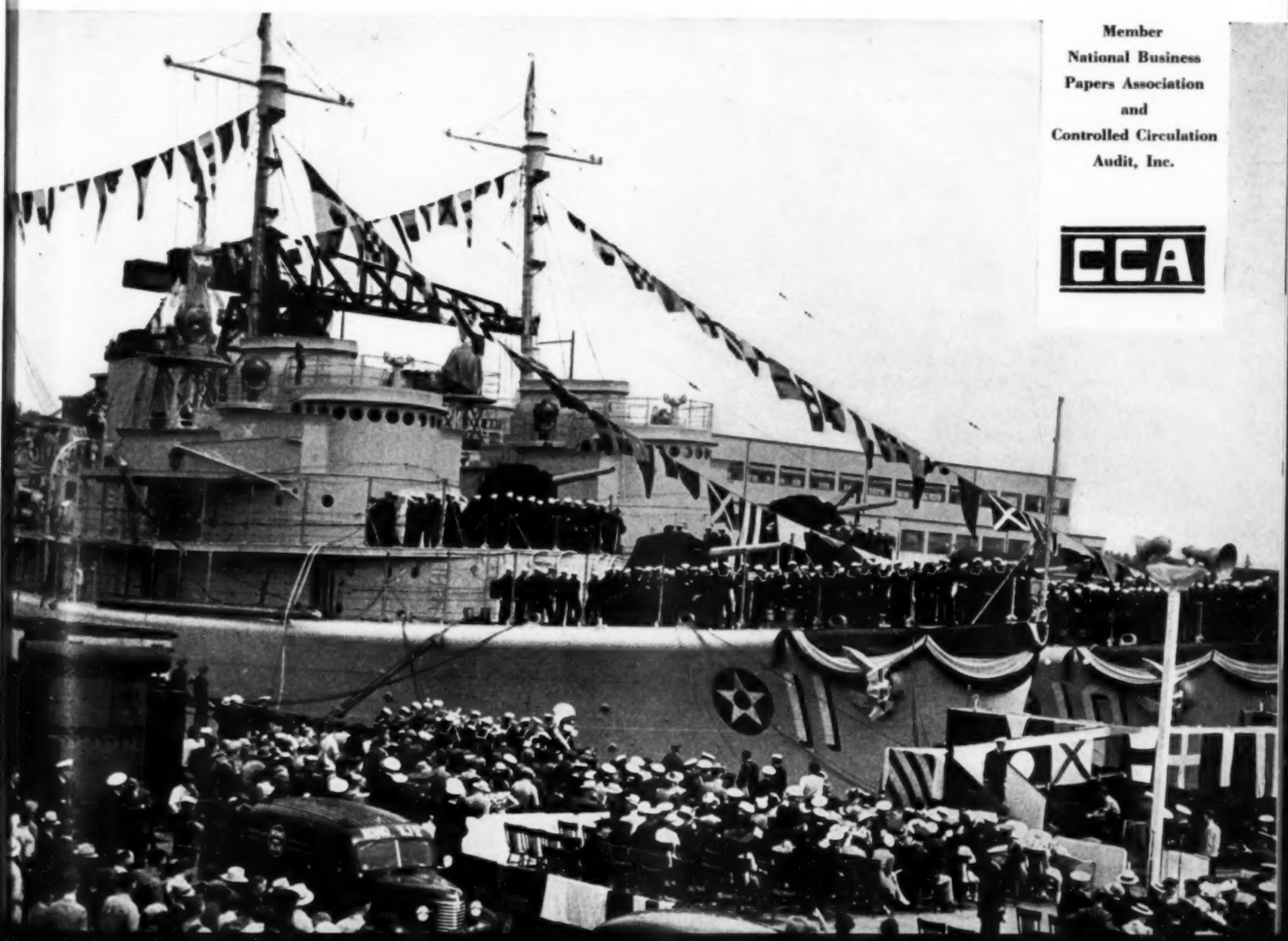


# A NEW DIESEL TANKER FOR SPENTONBUSH FUEL TRANSPORTATION COMPANY

*By* REX W. WADMAN

*Thomas W. Drennen, Manager of Fairbanks, Morse & Company's New York Branch.*

THIS is going to be more of a story of a man than it is of a new ship. These days, ships come and ships go, but a man only gets a ship named after him once in a lifetime—and not always then. The man in the case is Thomas W. Drennen and the ship is the *T. W. Drennen* —and I'll tell you about the ship later.

Tom Drennen should have a ship named after him. I doubt if there is a more popular man on the Atlantic Seaboard. He has a host of friends because he has been a good friend to have and to hold. A big man physically, a big man mentally, Tom Drennen has been tied into this Diesel Industry most all his life. A native New Yorker, he started working for Fairbanks, Morse & Company twenty-five years ago. He worked up to Marine Sales Manager of their New York Branch in 1924 and just everybody in the marine business seemed to know him and most of 'em liked him—they couldn't help it; he's that kind of a guy.

In 1932, merit got its pay—Tom became manager of the Fairbanks-Morse New York Branch, one of the, if not the biggest job the company has to hand out. His territory stretches from Connecticut down to Norfolk, and out into Eastern Pennsylvania—quite a chunk to handle and it takes a big staff to cover it. Tom Drennen directs that staff with a kindly driving force that produces orders and then more orders. There is one thing about it—when Tom tells somebody to go do something, he can and will, on occasion, do it himself, thoroughly and efficiently. In fact, Tom Drennen has been a highly successful branch manager. His success in this field is attested to by the fact that, under his direction, the business of the New York Branch, has, on THREE occasions, been the recipient of the President's Cup —an award made yearly by Colonel Robert H. Morse to the branch obtaining the greatest percentage of its quota. And so, it is hard to find anything more important right now in the marine field than a tanker—also hard to find a man in the marine field better liked or more respected than Tom Drennen. Put the two

*The 260 ft. Tanker "T. W. Drennen" on her trial trip off Camden, N. J.*

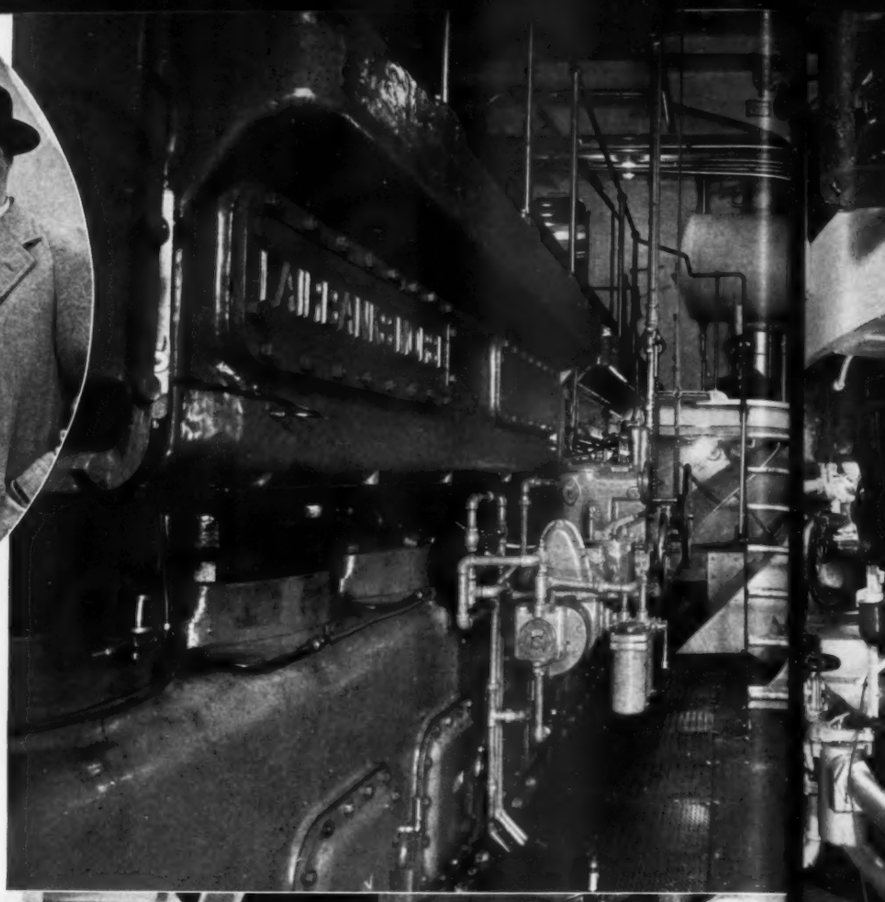
# A New Tanker Is Named After One of Our Industry's Really Big Men.

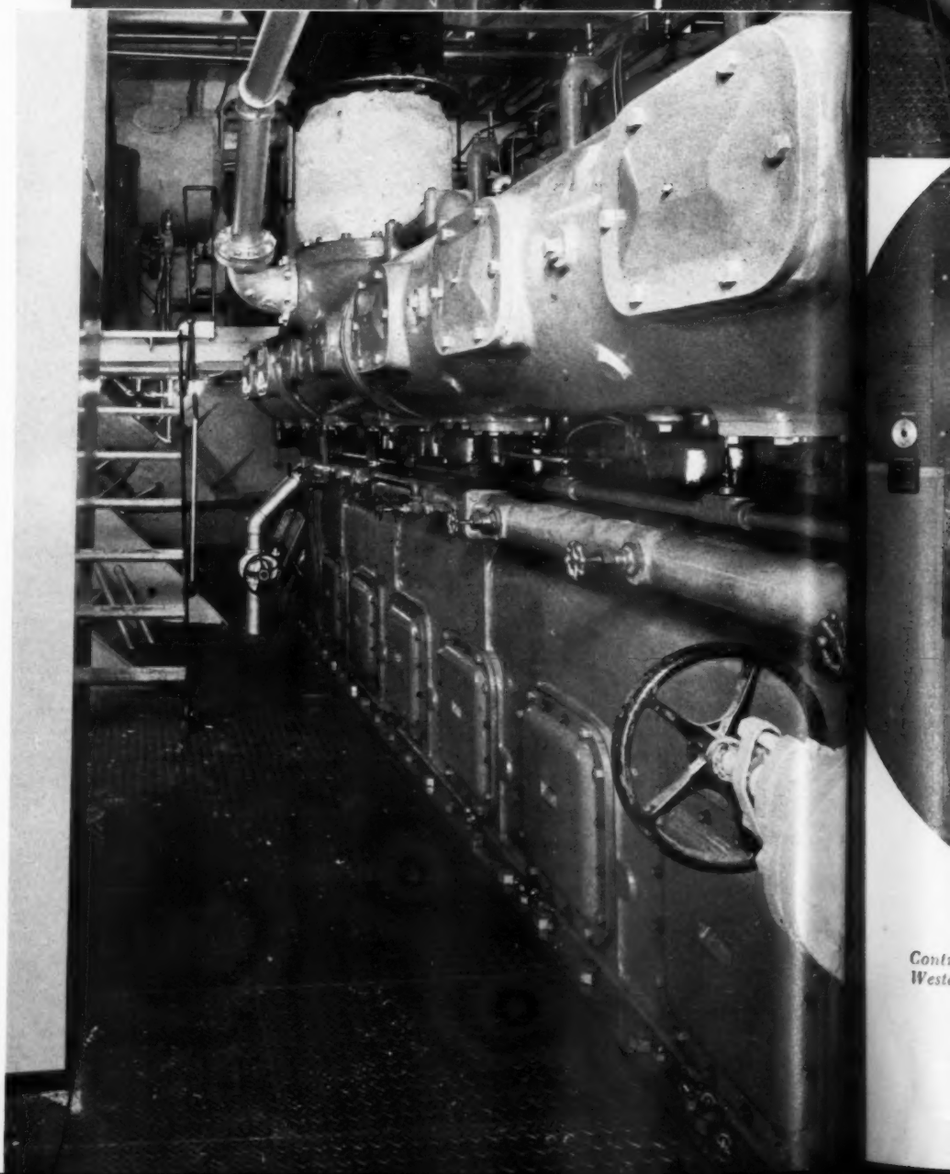
together and you really have something of interest to the entire marine fraternity as the recent completion of the tanker *T. W. Drennen* proved. This new 260 foot addition to the fleet of the Spentonbush Fuel Transportation Company of New York City was launched July 19, and sponsored by Tom Drennen's fifteen year old daughter, Miss Lorraine Drennen.

Her trial trip was made on September 30 and though conducted in a quiet fashion, fully convinced all who contributed to her service, from loftsman to skipper, that she would fully live up to the tradition of her name. Designed and built by the new and progressive R. T. C. Shipbuilding Company of Camden, New Jersey, the *T. W. Drennen* or *Tom Drennen,* as the vessel will undoubtedly be called by all who know the genial F-M Manager, is the largest all-welded steel tanker ever built in Camden. With a gross tonnage of 1737.95 and a net of 1427, she has a cargo tank capacity of 22,000 barrels or 924,000 gallons allowing 2 per cent for probable expansion.

Her fuel requirements are taken care of by a main tank of 16,000 gallons, located aft, and a reserve tank of 12,000 gallons, located forward. A main tank aft of 5,400 gallons and a reserve tank of 11,000 gallons, forward, furnish the fresh water needs. The entry into service of the *T. W. Drennen* comes at a particularly opportune time.

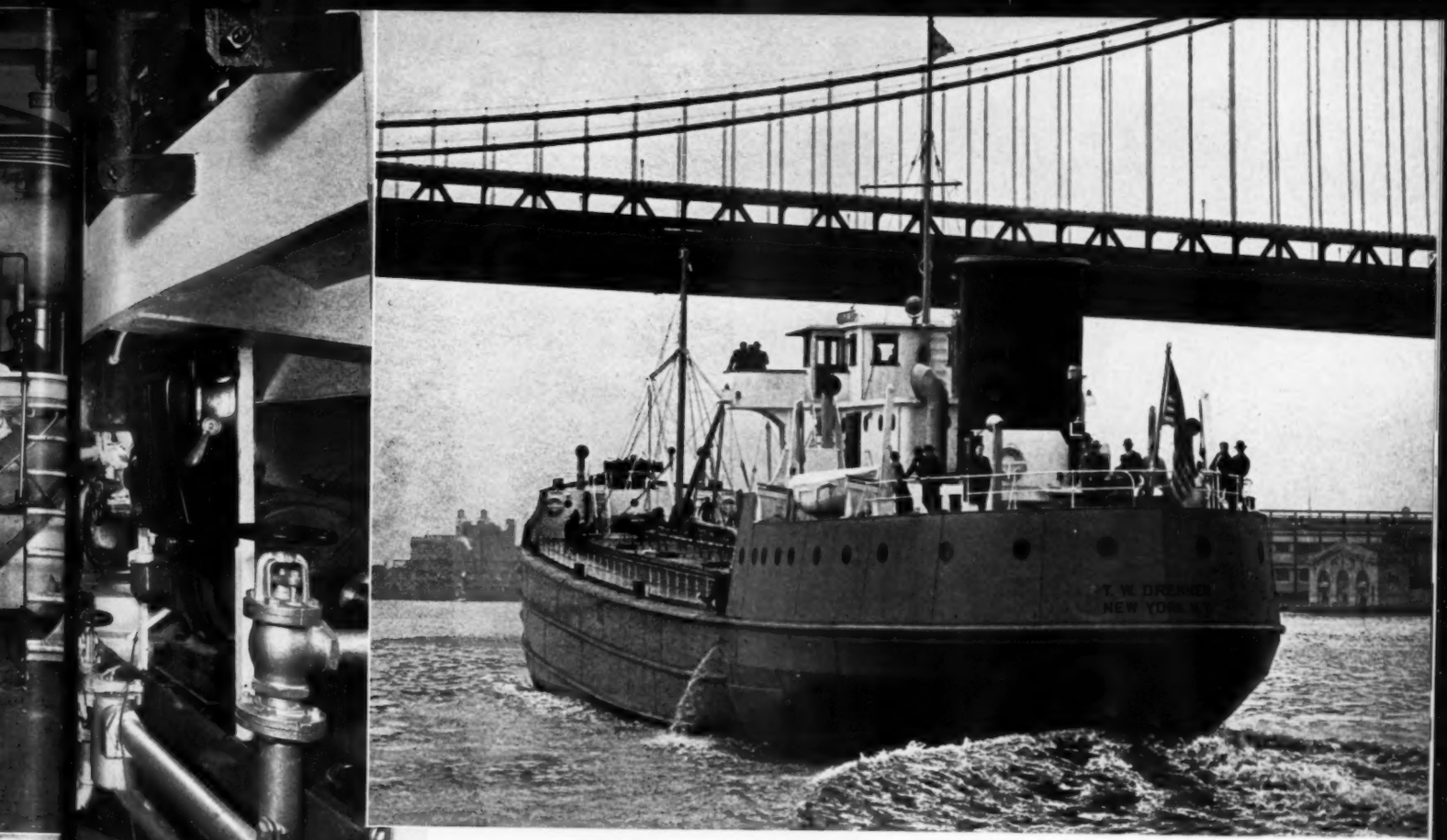
*Ira Bushey, a guest on the trip, and Tom Drennen on the deck of the new Diesel propelled Tanker "T. W. Drennen.*



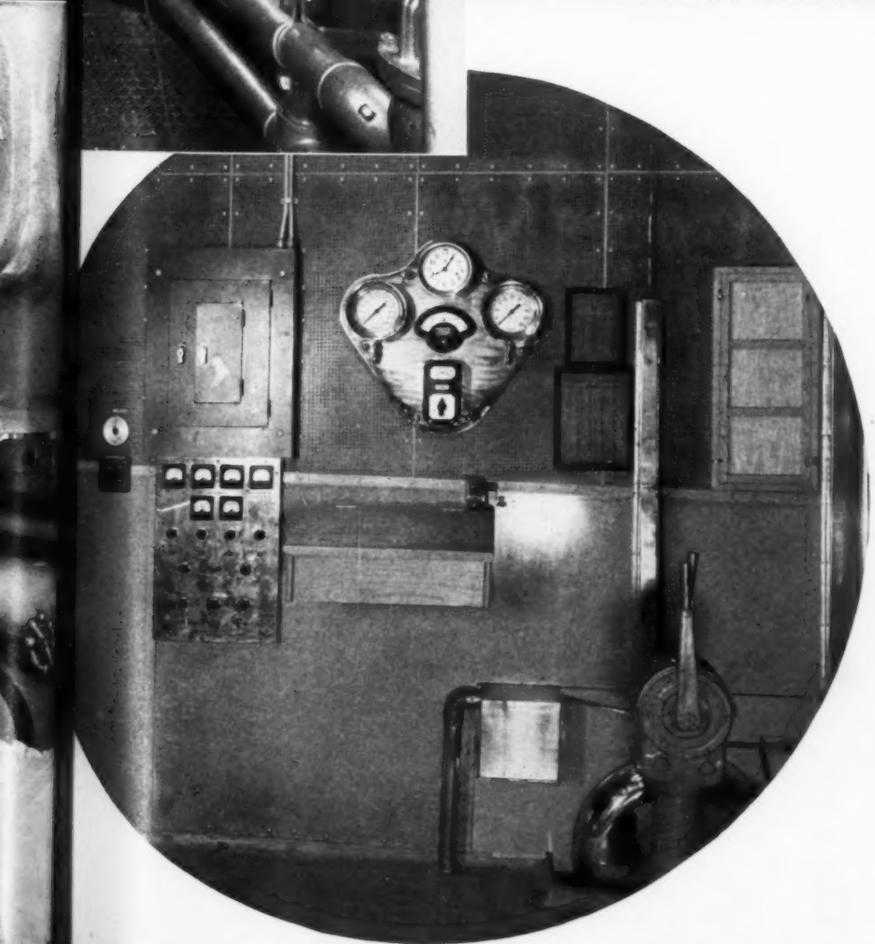


The many forward strides taken in the marine field in general are strikingly noted among tankers. A "Rip Van Winkle," who went to sleep on the tanker of 1921 and awoke on the tanker of '41, would rub his eyes in astonishment over the unbelievable changes that have taken place. Gone are the former, cramped, unpleasant quarters for the crew, and the complete absence of shore advantages. The move, since our legendary "Rip" went to sleep, has been to provide better, roomier, and more convenient quarters not only for the human element, the crew, but for the engine and machinery equipment as well. The *T. W. Drennen* is an outstanding example of this trend though done on a greatly magnified scale.

The *Tom Drennen* is powered with a Fairbanks-Morse marine Diesel engine. The operating and economy success achieved by these engines in over a dozen other tankers of the Spentonbush Fuel Transportation Company led these people to again specify F-M. In this case, the main propelling unit is a 7 cylinder, 16″ bore x 20″ stroke, direct reversible F-M marine Diesel engine, rated 1225 hp. at 300 rpm., with oil cooled pistons, open-head combustion, differential injection valves, back flow scavenging, built in pumps and compressor auxiliary. The Diesel engine generating set which complements the main engine consists of a Fairbanks-Morse six cylinder, 90 hp., 900 rpm., 5½″ x 7½″ Model 36 marine Diesel engine direct connected to a Fairbanks-Morse 60 kw. generator, with regular equipment mounted on a common sub-base.



*Stern view of the new Tanker "T. W. Drennen" as it goes under the Philadelphia-Camden Bridge on her trials.*



*Control station on upper engine room flat showing Alnor pyrometer, Weston tachometer, and U. S. gauges. Auxiliary switchboard at the left.*

Two Atlas, 4 cylinder, 75 hp. Diesels, located forward of the engine room bulkhead, drive the cargo pumps through Twin Disc clutches. Each of these engines is fitted with Purolater fuel and lube filters, Alnor pyrometers, and Groco lube oil coolers. The port engine also drives a service pump and the starboard engine drives a 30/35 kw. auxiliary generator. These engines furnish the chief features of the spacious lower engine room, which is of two elevations with a balcony surrounding the upper half and the main engine in the section below.

Those with a weather eye for machinery noted with interest the many high quality auxiliary items found in this section of the vessel, including the Schutte & Koerting heat exchanger, oil cooler and duplex lubricating oil strainer, the Maxim intake and exhaust silencers, and engine-mounted Nugent fuel oil filters.

The upper section of the lower engine room is particularly well laid out from the viewpoint of accessibility. A neat bank of Edison storage batteries and the Youngstown Miller oil purifier for the main engine are features here. Also worthy of mention is the Smith-Meeker switchboard with Brown pyrometer and Weston elec-

trical meters and a Gardner-Denver motor driven auxiliary air compressor unit, consisting of a 38.9 cubic foot per minute scavenging air compressor directly connected to a Fairbanks-Morse 15 hp., 150 volt direct current motor. A Purolator fuel oil filter and a De Luxe lube oil filter are both found on the Fairbanks-Morse generating set.

Fairbanks-Morse was also able to furnish the tanker's pump needs and these include an auxiliary main oil and circulating water pump directly connected to a 15 hp. F-M, two 3/8", all bronze perfection rotary pumps, direct connected on a common sub-base to 1/4 hp., 115 volt, D.C. Wagner motors, a 2" F-M bronze-fitted perfection rotary pump, direct connected on a common sub-base to a 1/2 hp., 115 volt D.C. F-M marine type motor, and a 3" F-M, centrifugal pump direct connected to a 7 1/2 hp. motor. Two 450 gph. Fairbanks-Morse fresh water systems are used, as well as a 450 gph. F-M system for salt water for sanitary service.

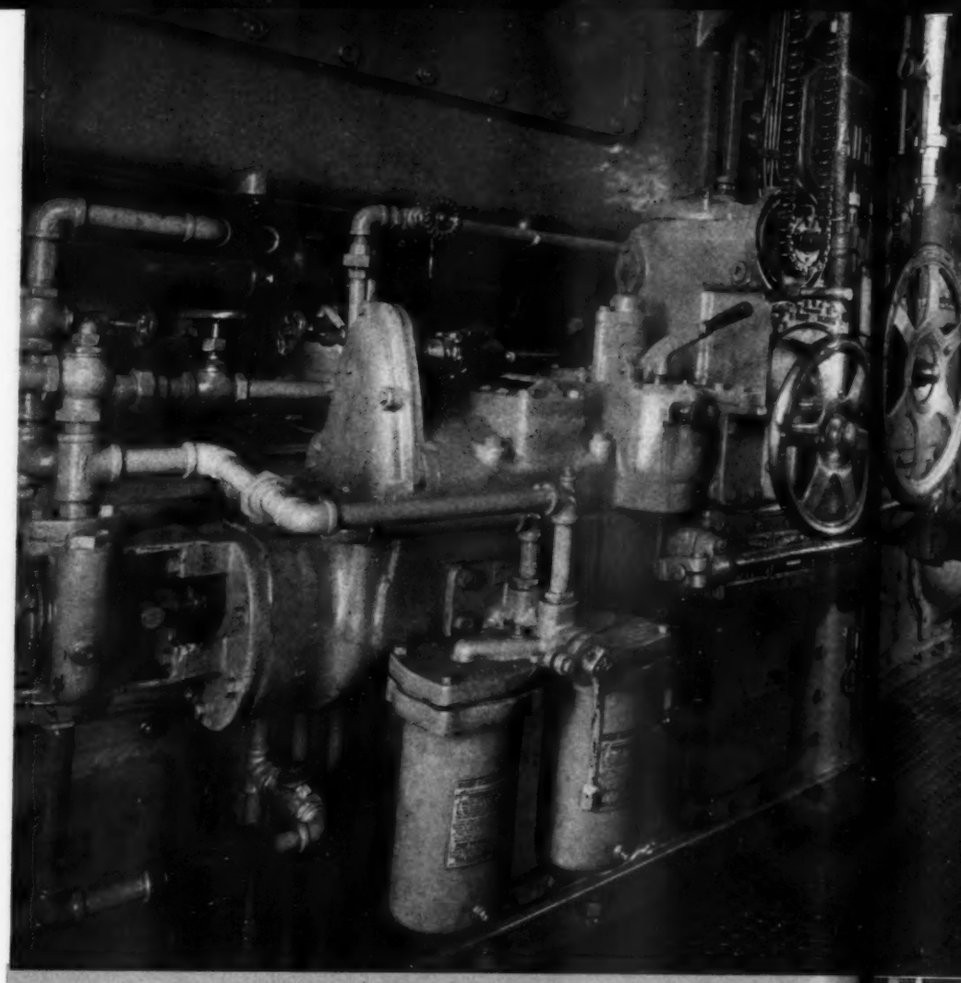
The upper engine room is of abundant proportion and features the Fairbanks-Morse remote engine control. On the port side of the remote engine control is the gaugeboard with Brown pyrometer, Weston tachometer and Lonergan air gauges. This board is of Smith-Meeker construction, as are all the switchboards on the tanker and utilize the suggestions of the R. T. C. Shipbuilding Company. This upper engine room furnishes a passageway off which we find the quarters of the Chief Engineer, mates, steward, assistant engineer, oilers, and sailors.

On the starboard side abaft is the entrance to the large and spacious galley. This extensive galley which is light and airy and banked with portholes is particularly representative of the commodious and complete way the *T. W. Drennen* is finished.

The Rex Refrigerator Company has done itself proud in the two large cold storage rooms for meat and other perishables, as well as the large electric ice-box, all of which have their motors directly below as a space accommodation. The familiar Webb Perfection Range with Val Jean carburetor is furnished by Elijah Webb & Company. Several of the other items which contribute to the crew's inner needs include the Franklin Automatic Water-Cooler, the large coffee percolator by W. E. Dougherty & Sons, and the table and chairs by the Chicago Hardware Co.

Probably the first impression of this ship upon entering any of the crew's quarters can be summed up in one word—size. Utilizing a plan of a pair of double bunks for the sailors, single double bunks for the mates, oilers, etc., and a single berth for the chief engineer, all rooms boast of extensive floor space, and are both attractively and usefully furnished. Each room contains either single or double metal lockers and shelf space furnished by Lyons.

There is also ample drawer space beneath the bunks, wall or separate writing tables, mirrors above the wash basins furnishing hot and cold running water, steam radiators and chairs. A good size bathroom with shower and toilet facilities separate the rooms. Johns-Manville sound-proofing is used in these quarters as throughout the vessel. It is well worth mentioning that in the wireless operator's room, the equipment, which includes short and long wave, transmitting, receiving and emergency equipment, is complete to a point usually only found on the very largest size tankers. All of this equipment was supplied by the Radio Marine Corporation of America.



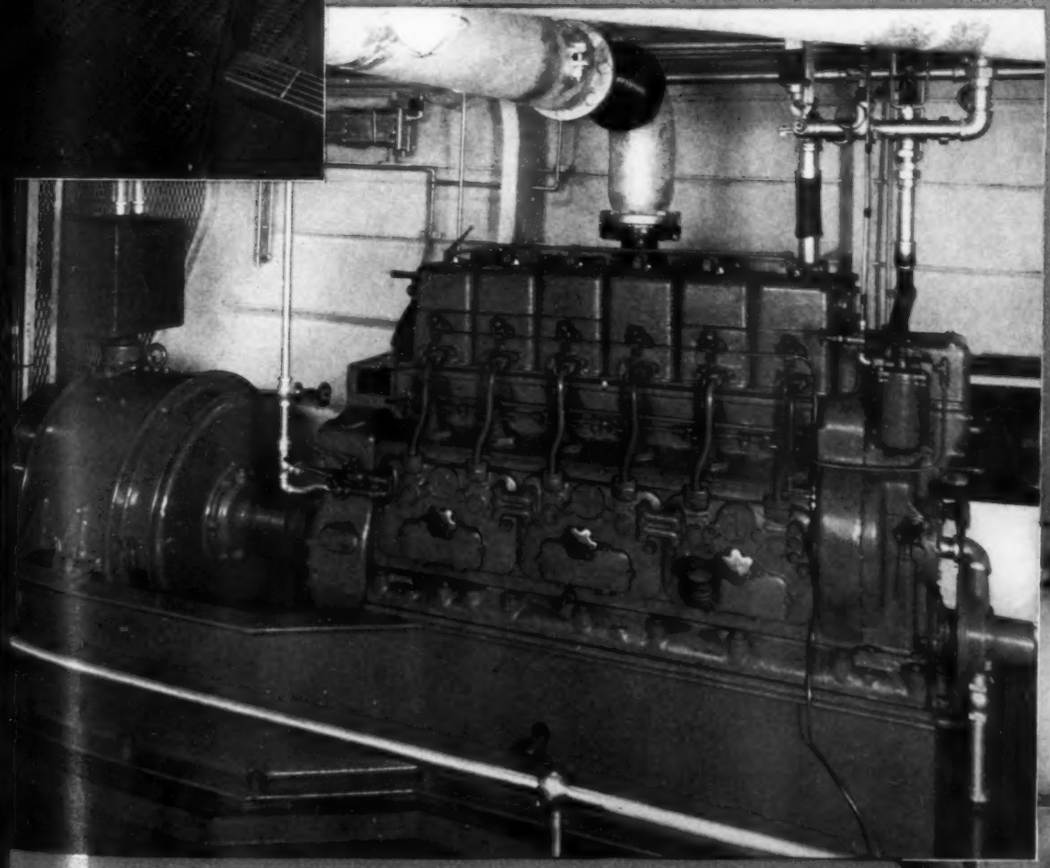
*Close up of the control station on the main Fairbanks-Morse engine showing Duplex Nugent filters in the immediate foreground.*

The pattern of luxury and completeness extends in every detail to the pilot house, where we note the Negus Compass, the American Engineering Company Wheel, the Western Electric Ship to Shore Telephone, the Bludworth Direction Finder, Weston Tachometer and the several other features that go to make up a pilot house "where nothing is forgotten."

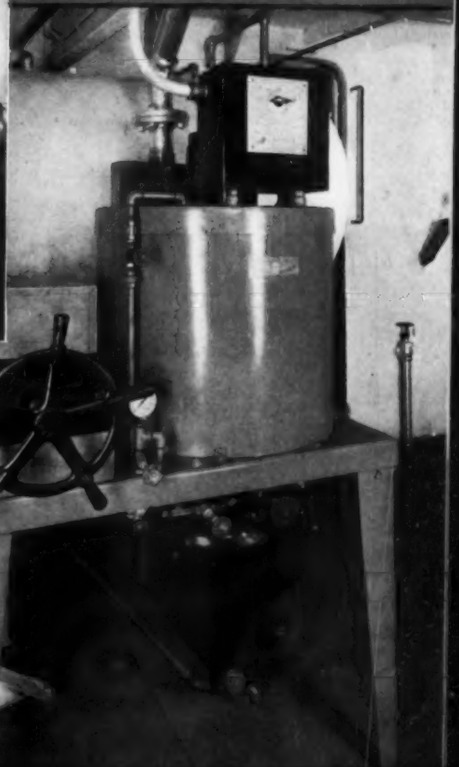
The trial trip itself, taken on Tuesday, September 30, 1941, was a particular source of satisfaction to all interested parties. From the time the *T. W. Drennen* left the R. T. C. yard at 9 A.M., until the crew hoisted the traditional broom from the mast in late afternoon, signifying a "clean sweep," the many strenuous machinery tests were very successfully conducted.

It was early evening when the *Tom Drennen* tied up at the R. T. C. dock, inaugurating a career of service for this tanker, a highly successful start and, if she emulates the career of her namesake, one that should set many marks

*Rear of commodious pilot house showing chart table, direction finder, and Weston tachometer.*



*Youngstown Miller oil clarifying unit as installed on the new Spentonbush Tanker "T. W. Drennen."*



*One of the two 6 cylinder Fairbanks-Morse 90 hp., Model 36, marine Diesel engine auxiliary units direct connected to a F-M 60 kw. generator.*

*Rural electrification modernized the Don Uebele store with electric refrigeration, ranges, lighting, radio, and motor driven gasoline pumps.*

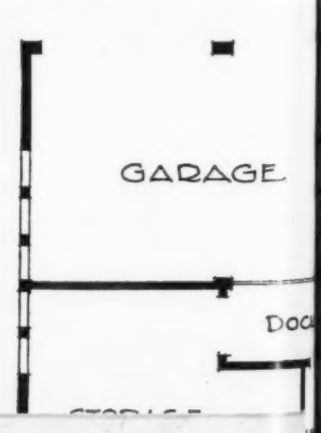
# PORTLAND, MICHIGAN

## *TRI-COUNTY ELECTRIC COOPERATIVE*

IN central Michigan, just twenty-one miles west of the state capital, lies the village of Portland. Situated on busy U. S. Highway 16 between Lansing and the "furniture city", Portland is by no stretch of the imagination one of those sleepy little villages one reads of —it fairly hums. On August 9th the tempo of activity was up, for residents of Portland and farmers from the district of which it is a center were celebrating the opening of the new power plant, central offices, warehouse, and garage of the Tri-County Electric Cooperative. Dedicated to, and named in honor of Clarence A. Winder, chief of the Cooperatives Operations Division of the Rural Electrification Administration, the new power plant is a model one. Four years ago it was just a dream—today, the dream has become a very definite reality.

It is fitting that this modern Diesel generating plant should bear the name of the man to whom all members and officers of the Cooperative spontaneously give credit for its final building and placing in service. His constant assistance in the face of many adversities met by the organization in its labors to bring electric power to the farmers of central Michigan, at a price they could afford to pay, is well known to all of them. Small wonder then that the nearly five thousand members of this growing cooperative and the residents of Portland should join in celebrating the opening of the Clarence A. Winder Generating Plant of the Tri-County Electric Cooperative.

*Lower left: Exterior of the Clarence A. Winder Generating Plant, Tri-County Electric Cooperative, Portland, Michigan, and, directly below shows the layout of this plant.*



The short history of this progressive organization reads like a fairy tale, and indicates to some extent how anxious the residents of rural areas are to obtain the benefits which electrification brings to their farms and homesteads, especially when those benefits are received at the economical figures which cooperative planning and Diesel-engine-generated power assure.

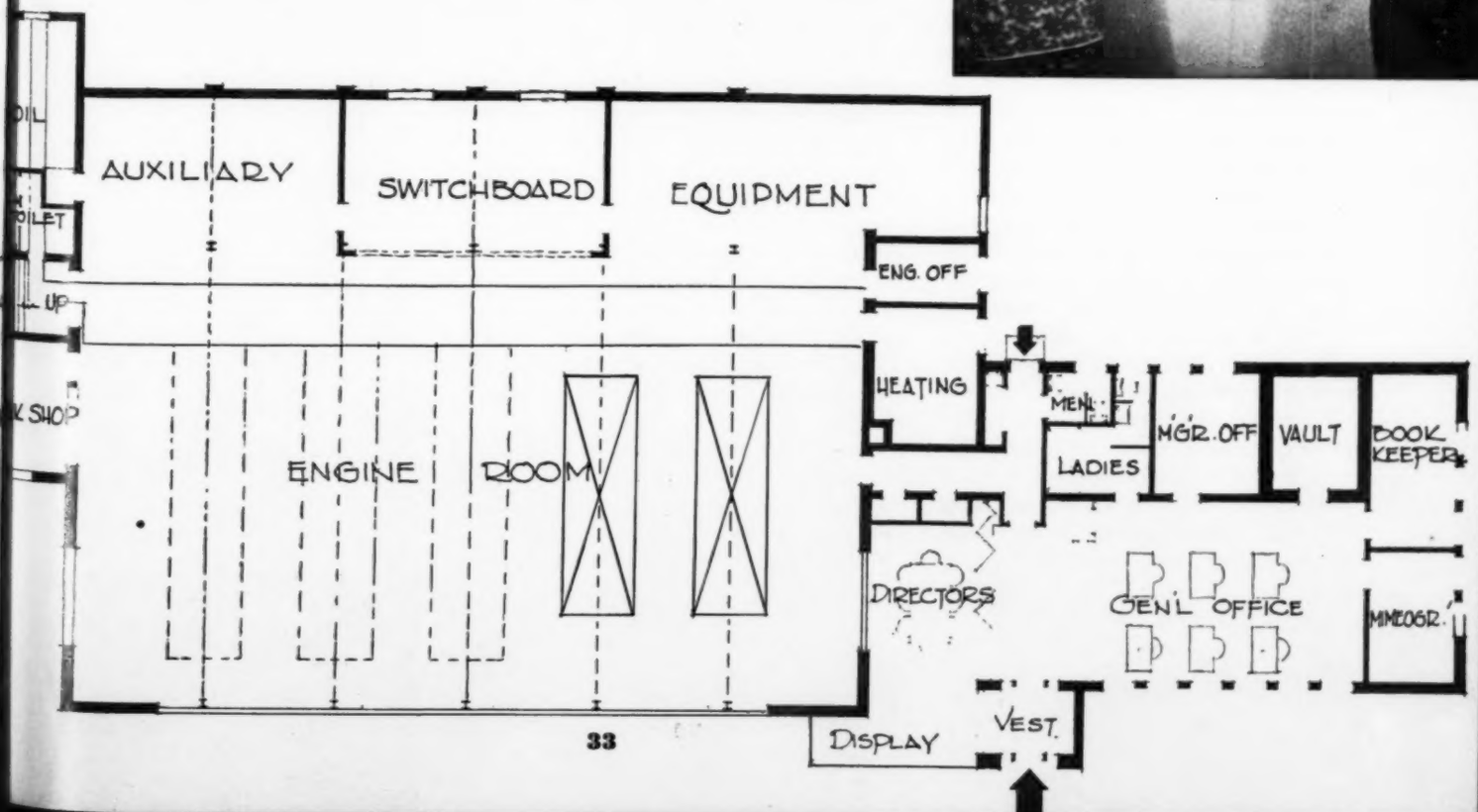
In March of 1937, and shortly after the Rural Electrification Administration was created by executive order of President Roosevelt, a small group of farmers from Eaton, Ingham and Jackson counties incorporated themselves under the name of Tri-County Electric Cooperative and made application to the federal government for funds with which to bring electric power at reasonable cost to the farmers of those counties. On April 7, they were granted their first loan of $400,000.00 and soon began the building of lines. Farmers in neighboring counties got wind of this "young upstart" organization. They, too, wanted electricity for their farms and homes, and they came to the group with their wants. The lines were extended to cover the counties of Gratiot, Barry, Ionia and Clinton through an additional allotment from REA, and two Diesel engines were installed in a privately owned industrial power plant at Eaton Rapids. Partially hydro-driven, this generating plant furnished energy for the Cooperative's first miles of lines for many months. This, then, was the nucleus around which a going and growing organization was to be built. New members were being secured each day. (Every user must be a member, and even the village of Portland carries its own membership.) Another group of farmers from counties still farther north petitioned the Cooperative for membership and extension of lines into their counties. Tri-County Electric Cooperative requested another loan from REA, received it, and pushed their lines into the counties of Montcalm, Isabella and Mecosta. A few months later, the counties of Saginaw and Clare were added to those already receiving service from the Cooperative.

The urgent need for another generating plant to furnish electrical energy for these many new miles of lines serving farmer-users was now being felt. More funds were applied for and the first wholly-owned generating plant of the Cooperative was erected at Vestaburg and placed in service during May of 1939, with three Diesel engines of 500 hp. each furnishing power for their generators. Since that time, two more Diesels of 1,000-hp. each have been installed at Vestaburg, making it one of the largest plants of its kind.

Early in 1940, Tri-County Electric was requested to furnish energy to the O & A Electric Cooperative at Newaygo, in Newaygo County, and arranged to do so. Tri-County now serves approximately 900 miles of the O & A system.

Recently, a reciprocal standby contract was signed with the village of Portland. Thus, we see that the name Tri-County has in four short years become something of a misnomer, for the Cooperative's lines now extend into no less than thirteen counties and ninety-two townships, representing an area some 152 miles long and 42 miles wide. The number of its members total very close to five thousand and an average of fifty new members are secured each month.

It took little more than a year after the completion of the Vestaburg plant for the Board of Directors of the organization to realize that, with its continuing growth, another generating plant would soon be needed, as would also central offices, a garage and warehouse. In February, 1941, plans were complete for a modern office building and generating plant. A site just outside the limits of the village of Portland was selected, and another government loan was forthcoming. All of this brings us



forward to the dedication and opening of the Clarence A. Winder Generating Plant.

The accompanying plan drawing of the plant indicates its layout as designed by J. & G. Daverman Company, architects and engineers of Grand Rapids. Built by Bert Aalsburg, also of Grand Rapids, the building is of white brick with gray stone trim. The major portion of its facade is taken up by the windows of the engine room. Extending from ground to roof, these steel sash windows are motor operated to open and close at the touch of a button control.

A display entrance, to accommodate electrical appliance exhibits, and a directors' room are located between the engine room and the offices with a double plate-glass window excluding engine room noise, yet affording visitors a full view of the generator ends of the power units.

A roomy workshop at the opposite end of the engine room is also separated from it by a double window. The offices are quite modern with all steel furniture and ample windows. Fireproof construction is readily apparent. Fluorescent lighting is used throughout the building, while an incandescent lighting system is installed to operate from storage batteries in case of an emergency.

Waste heat from the power units is utilized in the heating of the building during cold weather. A Premier oil-fired furnace, with 250-gallon fuel oil tank, augments this arrangement and will assure adequate heat for severely cold weather conditions and during periods of light load or complete shutdown. Louvres at floor and ceiling height in all parts of the plant circulate warm air. All office ceilings are completely insulated, and the composition roof and ceiling of the engine room functions as an acoustical and insulation material.

The plant is built to accommodate five Diesel engines, their generators, and auxiliaries. The first two units installed are Cooper Bessemer eight-cylinder engines, rated 688 hp. each at 400 rpm. Cylinder bore of these engines is 13" and piston stroke 16". Their fuel systems are the patented Controlled-Pressure arrangement whereby fuel pressure at the individual spray nozzle in each cylinder head is automatically relieved between injection periods to prevent nozzle-dribble. The engines are served by full-pressure lubricating systems. Oil-cooled pistons are a feature. This is accomplished by means of a constantly circulating supply of lubricating oil being forced through fully enclosed chambers beneath the piston crowns, and makes for low operating temperatures with a greater safety factor for emergency overloads, and close cylinder-to-piston clearances. Individual cylinder heads of the engines are fitted with dust and dirt-tight covers. Due to the convenient arrangement of fuel injection valves, which are mounted en bloc on the camshaft housing cover, cylinder heads may be removed for inspection without disturbing fuel injection system adjustments. Rugged through-bolt construction is another feature of the power units, with strong steel bolts running upward through the engine from the trusses beneath the main bearings to the cylinder heads, holding base, centerframe and cylinder block together under compression and effectively relieving those cast parts of all heavy tension stresses. Meehanite Metal, which is used throughout the engines for all cast iron parts, adds further to the units' structural strength.

Generators are of Electric Machinery Company manufacture and utilize the rotor of the generator as a part of the flywheel. These combined flywheels and generators make for a very compact and space-saving arrangement. The generators are 493 kw., 2400 volt, three phase, 60 cycle units, with their 5 kw., 125 volt exciters being V-belt driven and pedestal-mounted directly above the outboard bearings and making for still greater compactness and a decidedly neat appearance.

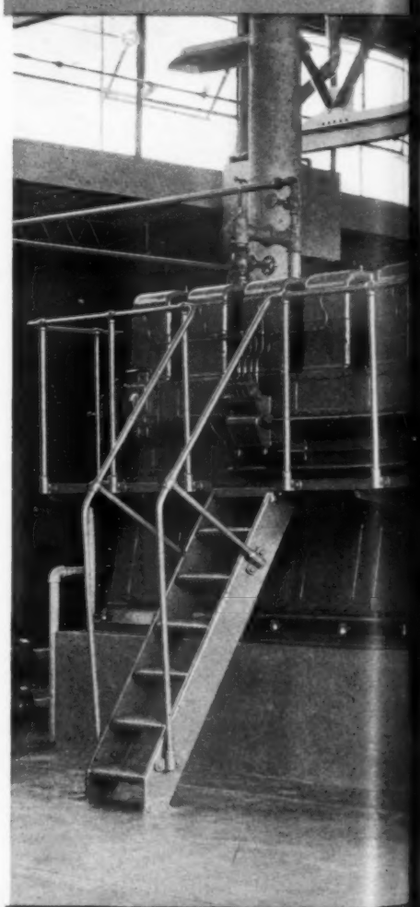
An accessories pit runs the entire length of the engine room and is covered by steel, non-slip floor plating, fitted flush with the concrete floor. Fuel oil day tanks, of 250 gallon capacity, one for each engine, are located in this pit. Two Adamson fuel oil storage tanks, with capacities of 30,000 gallons each, are located at the rear and outside of the building.

They are mounted on reinforced concrete footings. A Levelometer indicates at a glance the quantity of fuel within these tanks. Fuel is transferred from the outside storage tanks to the day tanks within the building by means of two Goulds rotary pumps having a capacity of 20 gpm. and driven by 1 hp. Ideal Electric Company motors. A Briggs clarifier is located in the fuel oil line to the day tanks and has a capacity equal to that of the transfer pumps. Two Goulds rotary pumps of 3 gpm. capacity carry the fuel oil from day tanks to engines.

A Niagara 1¼ inch meter measures the flow of fuel oil from storage to day tanks and is equipped with trap strainer. Additional fuel oil strainers, mounted on the engines, are Purolator units. Lube oil storage tanks are also located in the engine room pit. There are two of these, with 250 gallon capacities, and having float gauges. Honan-Crane lube oil purifiers, with thermostatically controlled electric heaters, are mounted vertically in the pit, one for each engine. Lubricating oil heat exchangers, of Ross manufacture, are also installed in the pit. Three Cuno lubricating oil strainers, of the metal edge, Auto-clean type, are mounted in series on each of the engines and guarantee a thoroughly cleaned supply of purified lubricating oil to the units at all times.

Ample cooling water for the engines circulating water systems is secured from a 300-foot well. Water, of which there is an abundance in this locality, is also available from the mains of the village. All water used in the plant is treated by two large Crane Zeolite water softeners, served by a common charging tank. Two Carrier evaporative type condensor units serve the engines' water systems. Their intake and exhaust ducts open to the outside of the building

*Operating side of the Cooper-Bessemer D*



through the rear engine room wall. These coolers have ample capacity for a third Diesel engine. It is planned, however, that whenever any addition is made to the two engines now serving the plant, a third cooler will be installed, this to provide a standby cooling unit for emergency service. The circulating water pumps are Weinman and are driven by 7½ hp. motors. There are three of these pumps, each having a capacity of 200 gpm. against a 94 foot head.

Burgess exhaust Snubbers and Air-Maze intake silencers and filters are mounted horizontally on the roof of the building. These are fully concealed from view by the parapet of the building roof. Intake and exhaust lines from the engines to these auxiliaries are taken vertically from the engines through the roof. There is no horizontal piping within the engine room except for two small-diameter lines leading from the engines to the surge tanks which are installed inconspicuously on the rear wall.

Both engines are equipped with Alnor pyrometers having flexible thermocouples for each cylinder. A complete alarm and shutdown system guards the plant. The engines have overspeed shutdown devices, which through Mercoid switches, actuated by spring-loaded devices in the flywheels, shut off fuel supply to the engines in case of overspeed. Should engine lubricating oil pressure fall below normal, an alarm is sounded to call the operator's attention to the condition. If pressure continues to drop to a pre-determined point, the engine is automatically shut down. The automatic shutdown devices are interlocked with the oil circuit breakers which open when the engines are thus stopped. Low water and fuel oil pressures are automatically alarmed, as are high water and lube oil temperatures.

A Quincy air compressor furnishes starting air for the engines. This unit is driven by a 5 hp. motor and delivers air at 250 pound per square inch to two tanks located within the plant. A Cooper Bessemer gasoline-engine-driven compressor serves as a standby for any emergency when the motor driven unit is not available.

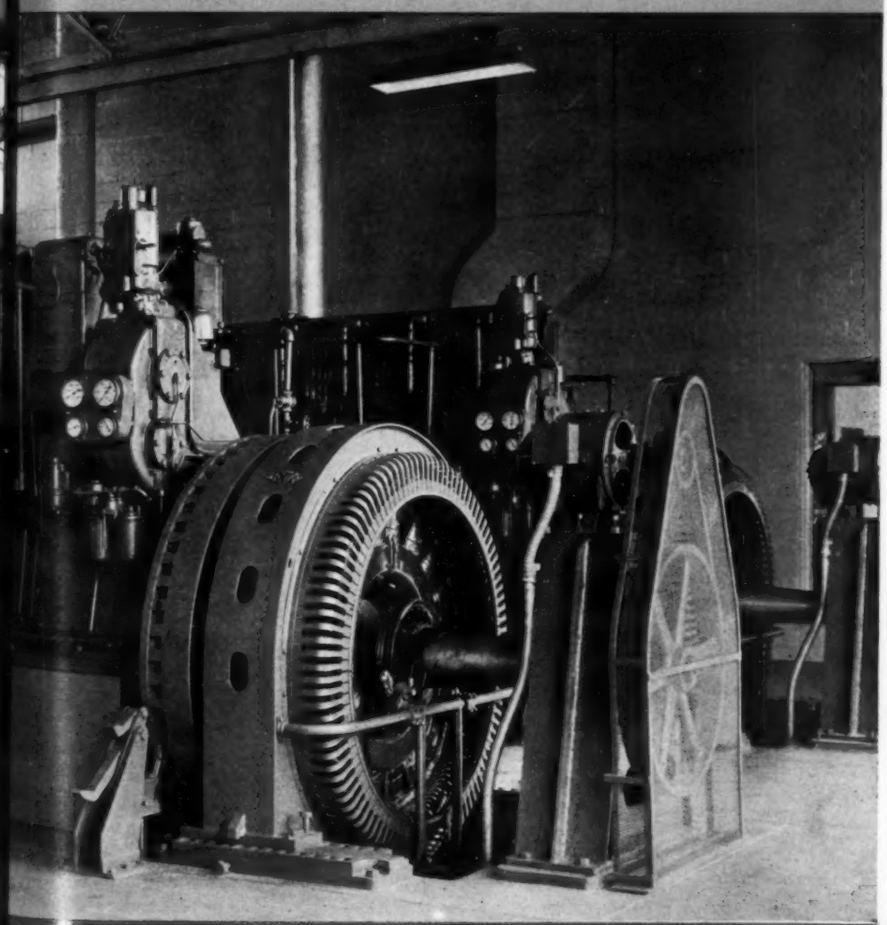
The engine room switchboard is of the full dead front type. The voltage regulator and synchronizing devices are Allis-Chalmers, while the remainder of the switchboard equipment is of General Electric manufacture. The engines are arranged for parallel operation. Their Pickering hydraulic governors have synchronizing motors and are wired directly to the switchboard for adjustment by the operator at the board, or manually at the individual governors. One operator can easily and exactly adjust the engines' operation at the switchboard controls. Electrical contractors for the plant were the Clement Industrial Electric Company.

As explained previously, the purpose of the new Clarence A. Winder Generating Plant is to better serve both old and new members of the Cooperative with adequate, dependable, and low-cost energy, while the aim of the project as a whole is to bring electricity to rural areas.

The village of Portland has already benefitted by construction of this new unit in the Tri-County system in that a new industry has located within the village limits on the strength of the fact that this generating plant will be well able to furnish 500 to 600 kilowatts for its daily manufacturing processes. Location of this industry in Portland hinged upon the fact that even though the village power plant could not absorb the entire load which the plant's operations would throw upon the lines, the Tri-County Generating plant, with which the village has a reciprocal agreement, assured more than enough power to meet its needs.

Dolph H. Wolf, with his offices in the new plant, is manager of the Cooperative. Its board of Directors is composed of seven members drawn from that number of sections into which the Cooperative's operations have been divided, and guaranteeing representation of members in even the most outlying districts it serves. Advantages to members, other than those already mentioned, are those of a cooperative agricultural education program, a program which will get into full swing just as soon as all details of the plant's operations are functioning smoothly. With the new plant designed to accommodate three more generating units, it is interesting to note that already enough members have been secured in the Portland area to use the entire output of the first two Cooper Bessemer units. Officers and employees are even now talking of the day when additional units will be installed.

*...wing the Electric Machinery generators, Purolator fuel filters, and Pickering governors.*



# F-M Diesel Powr
# "T. W. DREN

● Dependable, low-cost power will contribute to the profits earned by the tanker "T. W. Drennen," recently completed by the R.T.C. Shipbuilding Co., Camden, N. J. The propulsion engine is a 7-cylinder Model 37 Fairbanks-Morse Marine Diesel.

This 2-cycle, heavy-duty, direct-reversible Diesel, with 16″ bore and 20″ stroke, is rated at 1225 hp. at 300 r.p.m. It was chosen because of its proven capacity for outstanding performance under severe operating conditions.

Model 37's slow speed and heavy-duty construction mean slow wear. That, plus the simple F-M application of the 2-cycle principle, means less frequent, less costly servicing—a prerequisite to low operating cost. Oil-cooled pistons, differential injection valves, open head combustion, and back-flow scavenging are other Model 37 features which contribute to lasting dependability and economy of operation.

When you build or convert, get the complete story of F-M Marine Diesel advantages. Write to Diesel Headquarters—Fairbanks, Morse & Co., Dept. K24, 600 S. Michigan Ave., Chicago, Ill. Branches and service in all principal ports.

*The "T. W. Drennen," photographed on the new tanker's trial trip a month ago. Net tonnage, 1427. Capacity, 924,000 gallons.*

*Lower engine
Drennen," sho
Diesel from th
controls permit
engine room.*

☆

*One of many
the "T. W. Dr
set consisting o
Model 36 F-
nected to a 60-*

FAIRBANKS MORSE

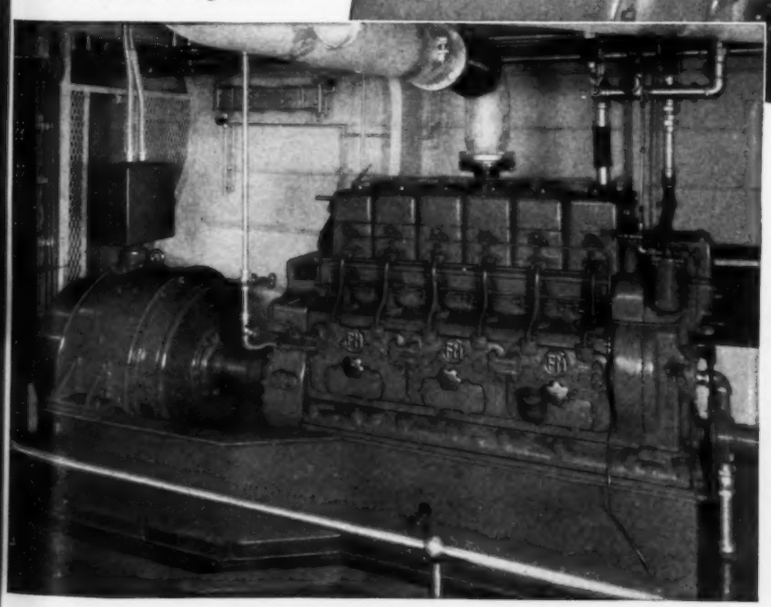
DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKER
PUMPS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONER

# wrs New Tanker NEN"

*Lower engine room of the "T. W. Drennen," showing the 1225-hp. F-M Diesel from the control side. Simple controls permit operation from upper engine room.*

☆ ☆ ☆

*One of many F-M auxiliaries on the "T. W. Drennen"—a generating set consisting of a 6-cylinder, 90-hp., Model 36 F-M Diesel direct-connected to a 60-kw. F-M generator.*



(Right) *Among a number of F-M motors on the "T. W. Drennen" is this 15-hp. direct current motor which drives the compressor for scavenging air for the main Diesel. Auxiliaries also include F-M pumps and F-M water systems.*

# Diesels

# DIESELS ON BAYOU

By WA

*Top left: Ice made in this plant is conveyed across the street to shrimp trawlers at the pier on Bayou La Fourche. Left: The Buckeye Diesel main power unit. Note Nugent and Luber-Finer fuel filters, Luber-Finer lube refiners, and Alnor Pyrometer.*

*Above: Gene power equip Buckeye Dies with Genera ammonia con tion of these*

BAYOU La Fourche is one of the ancient waterways of South Louisiana. Lying several miles west of the Mississippi and roughly paralleling it, the bayou eventually finds its way to the Gulf of Mexico among the old pirate and smuggler hangouts of Barataria and Grande Isle. All along its banks for miles and miles are homes and shacks and houseboats and villages, scenes which will never lose their charm in spite of irresistible modernization. One of these villages is Golden Meadows, thriving and bustling in spite of history and romance. The smuggling pirogues and bateaux

of the LaFit moved from ways and Di the Bayou La affection, hov asked by the Diesel install cations for a president of and Buckeye to Golden M there, they've of. Every so

# ON THE

By WARREN GLEASON

*Above: General engine room view. Complete power equipment consists of a large 225 hp. Buckeye Diesel and a Caterpillar 120 hp. Diesel, with General Electric generator and 9" x 9" ammonia compressor. Note the unusual decoration of these units and accessories.*

of the LaFittes and Nez Coupe are long removed from the telephones and concrete highways and Diesel-engined artificial-ice plants of the Bayou La Fourche of today. Romance and affection, however, are hard to suppress. When asked by the writer for a suggestion for some Diesel installation possessing unusual qualifications for a good write-up, Norman Maxwell, president of New Orleans Electric Engineering and Buckeye Diesel distributor, said, "Go down to Golden Meadows. Down at the ice-plant there, they've got a Diesel they really take care of. Every so often they take it all apart and go over it with tooth brush and polish. I never saw anything like the care that engine gets."

Mr. Maxwell was right. In the engine room of the La Fourche Shrimp and Ice Company, of Golden Meadows, La., is Jimmie Hebert, chief engineer, a man who simply loves his engines. There is no other way possible to describe it.

The floor of the engine room has its concrete squares painted in alternate colors, glossy and beautifully polished, as spotless as a jeweler's show-room, the soft maroon and gray resembling the marble floor of an antique palace. The main engine is a Buckeye Diesel of 225 hp. at 327 rpm.; the stand-by engine is a Caterpillar Diesel of 120 hp. at 800 rpm. And on these engines Jimmie Hebert has allowed his artist's soul to have full sway.

Here is no factory-production job of gray paint. Instead, both Diesels are resplendent in a deep maroon, faultlessly applied. Every conceivable panel, hand-hole plate and accessory on either engine is ornamented with striping in brightly gilded hand-painted designs. All the accessory machines, the compressors, the piping, the old steam-engine, are similarly adorned. The engine room resembles a World's Fair or a motor show display; yet, when one sees Jimmie Hebert gently lay a hand on an engine, all this decoration does not seem out of place; this engine room is his life.

As to power output of this Buckeye Diesel, it handles a 90 kw., 275 amp., General Electric generator of 240 v. at 1200 rpm. and a Frick, 9" x 9" compressor. The generator furnishes lights for the entire ice-plant and large canning factory and picking shed and for eight residences. Over a dozen motors of various sizes are used to drive machinery in the factory; there are three motors of five hp. and one of 20 hp. in the deep-well water system. For putting ice into shrimp trawlers, an electrically-driven conveyor system across the highway to the pier is used; a 5 hp. motor runs the elevator, lifting ice-blocks to the conveyor; another 5 hp. motor pulls the ice-crusher. Everywhere one turns in this extensive plant, there seems to be another motor getting its power from the Buckeye Diesel. "Oh, we know it's overloaded," says Mr. Hebert sadly, "but the engine takes it."

Concerning performance, it is of record that this Buckeye has been operating for five years. Service is continuous, twenty-four hours a day, every day. There is no shut-down for changing oil; this engine is operated continuously, full load, for a year at a time. Once a year Mr. Hebert takes the engine "all to pieces" and gives the insides as careful attention as he gives the outsides.

What has been the repair cost for all this? Parts and replacements? Total? "Less than fifty cents, altogether," says Mr. Hebert.

Equipped with the Buckeye Silent Watchman, automatic protection against cooling or lube failure, the engine is additionally protected by the Alnor Pyrometer system and a Nugent fuel filter. Two Luber-Finers, containing three packs, are fitted to the big Diesel so as to provide continuous lube oil refining while one filter is having its packs changed. Another Luber-Finer is installed on the Caterpillar Diesel, this unit containing one pack. Another small model is installed on the fuel oil system, to guarantee clean fuel supply. As to the efficacy of this equipment, Mr. Hebert shows oil from the Buckeye which has been in use for one year and is yet in perfect condition. On the Caterpillar, which is used for intermittent peak loads, the same oil has been in use for eight months without even changing the filtering pack.

According to the engineer, the Luber-Finer is more than living up to guarantees; among other benefits, there has been no trouble with nozzle-tips since installation of the filter. Lube oil used is Gulf Crown 8 on the Buckeye and Gulf Pride 30 on the Caterpillar.

Cooling of the engines is direct, from the firm's own wells. Consequently no tower is necessary which avoids water bills. The exhaust of the Buckeye is carried to a high stack, no muffler or silencer being used.

Ice is an essential commodity to the La Fourche Shrimp & Ice Company. Trawlers must be iced before putting out to sea; many of the shrimp are shipped fresh, with heads removed, which requires more ice and plenty of it; the shrimp plant, leased for operation to the Gulf Fish and Shrimp Company (General Seafoods subsidiary) employs around 500 hands.

The daily capacity of the ice-plant is 45 tons; while the original 100 hp. steam engine with its 10" by 10" Frick compressor can be used for emergencies, the main dependence of the La Fourche Shrimp & Ice Company—and the town of Golden Meadows—is upon the Buckeye Diesel which has been operated five years steadily at a repair cost of less than half a dollar.

A man who loves an engine can get a good deal out of it!

# TUNA CLIPPER "ANNA M."

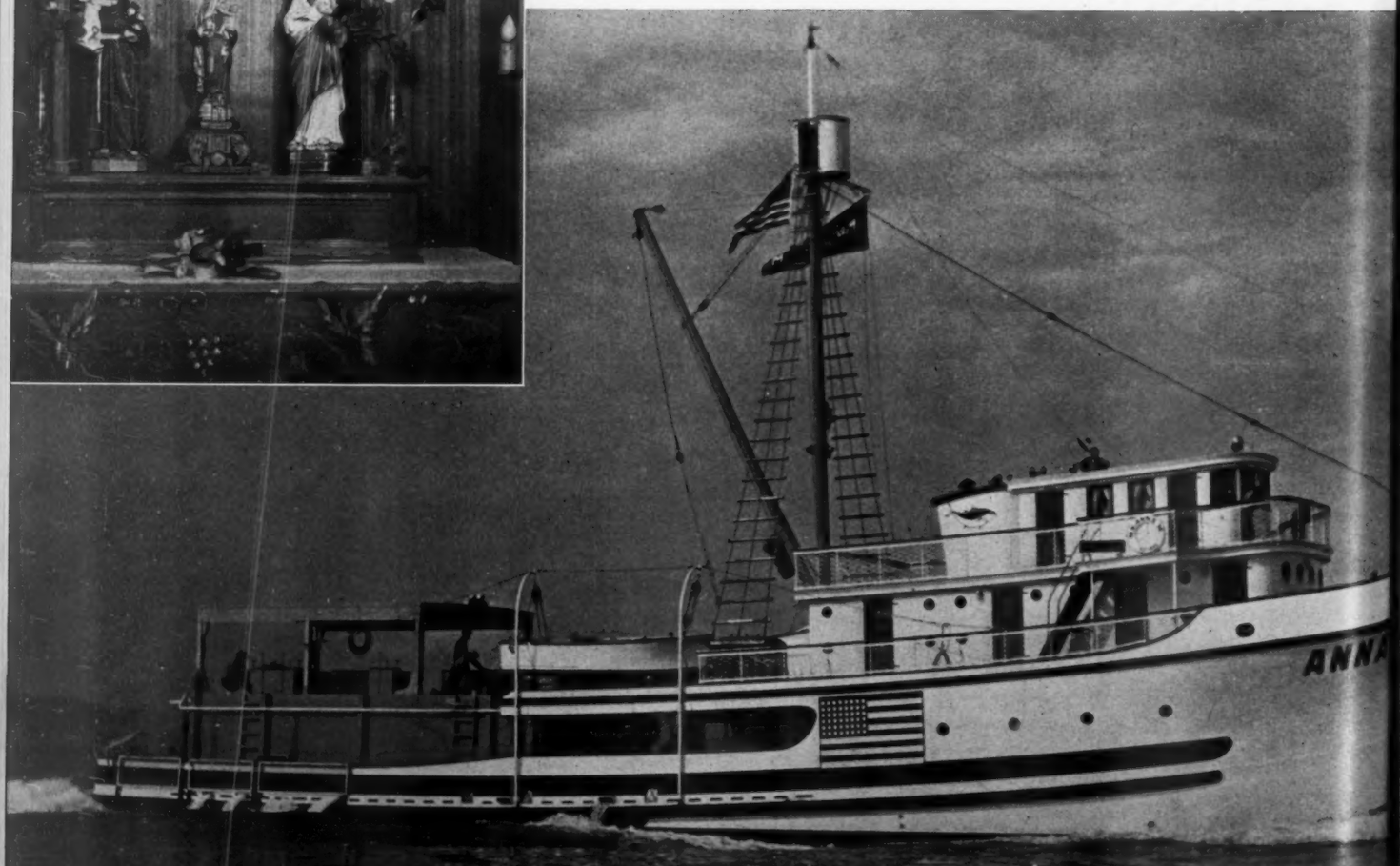
*By* CHAS. F. A. MANN

WITH Albacore, that finest species of the Big Four finny tribe commercially known as tuna when neatly cooked inside a small tin can, now approaching the Halibut Stratosphere of prices along the Northwest Pacific Coast, Astoria canners, at the mouth of the Columbia River, are paying $300 per ton for this magnificent and ordinarily warm water fish now found travelling 1,000 miles north of his California habitat and marauding in the blue-green Japanese Current otherwise reserved for salmon and halibut, thirty miles off shore.

Perhaps this peak of Albacore prices was destined to come at a time when the ancient fisheries of Gloucester, Mass., and the Los Angeles Tuna fishermen, joined hands to create another splendid ship, the *Anna M.*, named after Miss Anna Magellan, charming daughter of Capt. Wm. Magellan, head of the syndicate that owns this giant, ultra-modern Tuna Clipper, completed late in September at the bustling plant of Western Boatbuilding Co., Tacoma, by the Petrich Family, father Martin, and sons Hervey, Allan and Junior.

Keen observers of the mysteries of the fishing business smiled many times when the 112′ x 26′ x 12.8′ Diesel equipped *Anna M.* was being built at a cost of $180,000, even during the OPM Priorities on the 7,000 feet of double galvanized refrigeration piping. Capt. Magellan and his wife came North to build practically the ship to plans drawn from their "dream ship" and from years of lucky fishing as far south as Panama. Into this ship and woven around its completion are many angles,—many little things that converted a 100% Diesel masterpiece from an ultra-modern tuna clipper to a romantic legend, hardly before she sailed away from Tacoma for her registered port, Astoria, Oregon.

Into the beautiful hand carved altar, with its lovely setting, went the imagination and faith of a devout Portuguese family in whose veins run the blood of Magellan the explorer. The drapes, the bedding, the galley fittings, the shower curtains and heat and steam proof galley drapes, the Chapel furnishings, the unique Christening Ceremony performed at Old Town Dock, Tacoma's lucky old Fisherman's Dock, where Martin Petrich, President of Western Boatbuilding Company went swimming fifty-



two years ago, sans swimming suit, the fact that Miss Magellan busted the champagne bottle neatly over the prow, WHILE STANDING ON THE MAIN DECK, AFTER the ship was launched, outfitted, stored and the 250 invited guests were already aboard for the TRIAL RUN, all lent color to a peacetime commercial venture that took its trial spin off a harbor filled with wartime shipbuilding activity.

The ship will carry 210 tons of fish in a combination of ten large refrigerated tanks filled up in cyclic rotation as the Long Range Fuel tanks, then the bait tanks and finally the lower tuna holds are drained in rotation after perhaps two full months at sea. She is of 135 net registered tons and 265 gross tons. She is of heaviest sawn frame construction, made of clear grained Douglas fir of almost heroic proportions, and in spite of the placement of all Diesel and auxiliary machinery practically in the bow, has pleasing line, rides easily in the water and passed her stability tests in good shape. Deckhouses are heavily built with long fir framing, a minimum of secondary supporting members, and doors are of solid Burma teak. Inside the crew's quarters are panelled in Philippine mahogany and finished in white enamel trim, with bronze hardware, linoleum tile flooring and plenty of crew comforts such as roomy showers, locker spaces and even spring beds and mattresses.

Practically every surplus gadget has been omitted from the engine room, giving a power plant of remarkable simplicity and dependability. The main power plant consists of an 8 cylinder Enterprise Diesel, of carefully lightened construction, delivering 525 hp. at 400 rpm., with low headroom and narrow transverse dimensions a feature very important in the V prow of the forward part of the lower hull. Two lightweight 6 cylinder 7" x 8½" Atlas Diesel engines supply 120 hp. at 650 rpm. to drive two 60 cycle 240 volt Westinghouse generators, with 3 kw. separate exciters. The use of alternating current simplifies the whole ship's operation, with only one auxiliary needed most of the time. Regular 110 volt lighting is supplied the ship throughout, from one side of the generator windings, and all pumps and refrigeration machinery use 240 volt current. All three engines are placed side by side in the engine room, which provides a straight up pneumatic pilot house control with single lever, of the type designed by Enterprise Engine Company. An Alnor pyrometer and Weston tachometer is fitted on the main Diesel.

The general layout of the ship provides for storage of 27,000 gallons of fuel oil and 3,000 gallons of fresh water. Arrangements are made to utilize the steel-lined forward fish holds for fuel storage on the outbound voyage and, after 48 hour cleaning with special chemicals, they are opened, the refrigeration turned into the galvanized coils and used to store frozen tuna. Two large fuel tanks are fitted in the stern compartment, with fresh water tanks forward. The three large deck bait tanks are likewise chilled and cleaned and used to bring fish home after the last catch has been made.

Below, aft of the engine room, are the fuel tanks, followed by the fish holds, with a roomy pump and pipe tunnel running above the shaft alley to supply the circulating brine and seawater necessary for the fishing cycle. Outside hull planking is 2½" thick and 4½" inside lining, with an inner caulked lining in all tanks of 1¾" thickness, heavily coated with aluminum paint for a seal. More than 7,000 feet of galvanized 2" refrigeration pipe is coiled in the fish tanks. The entire deck from the galley aft is made up of fish tanks and bait tanks. The

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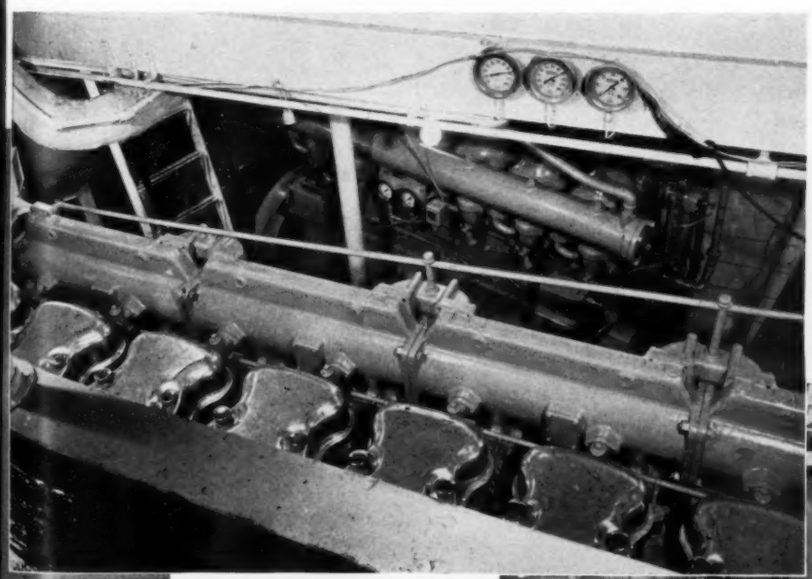
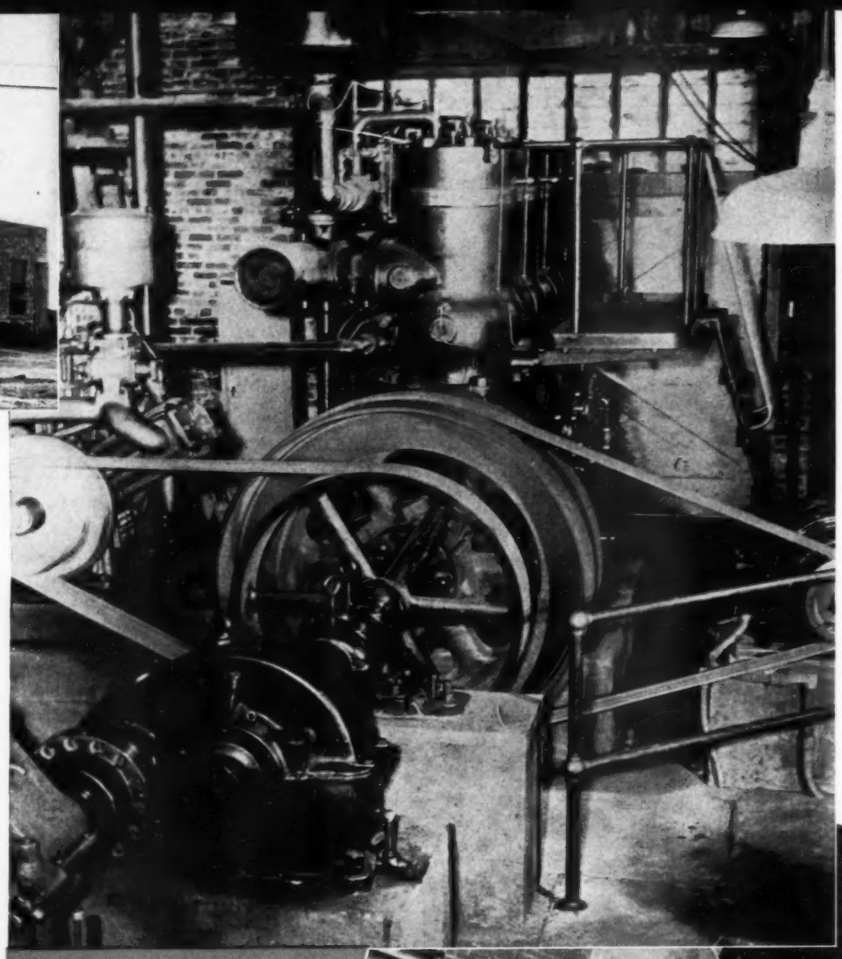


*Left to right: The beautiful hand carved altar in the ship's chapel. Next, the "Anna M" is the finest tuna clipper yet built on Puget Sound. Next: This view shows one of the two Atlas auxiliary Diesels and the top of the Enterprise propulsion Diesel. Below: Looking between the main and auxiliary engines. Note Woodward governor, center.*



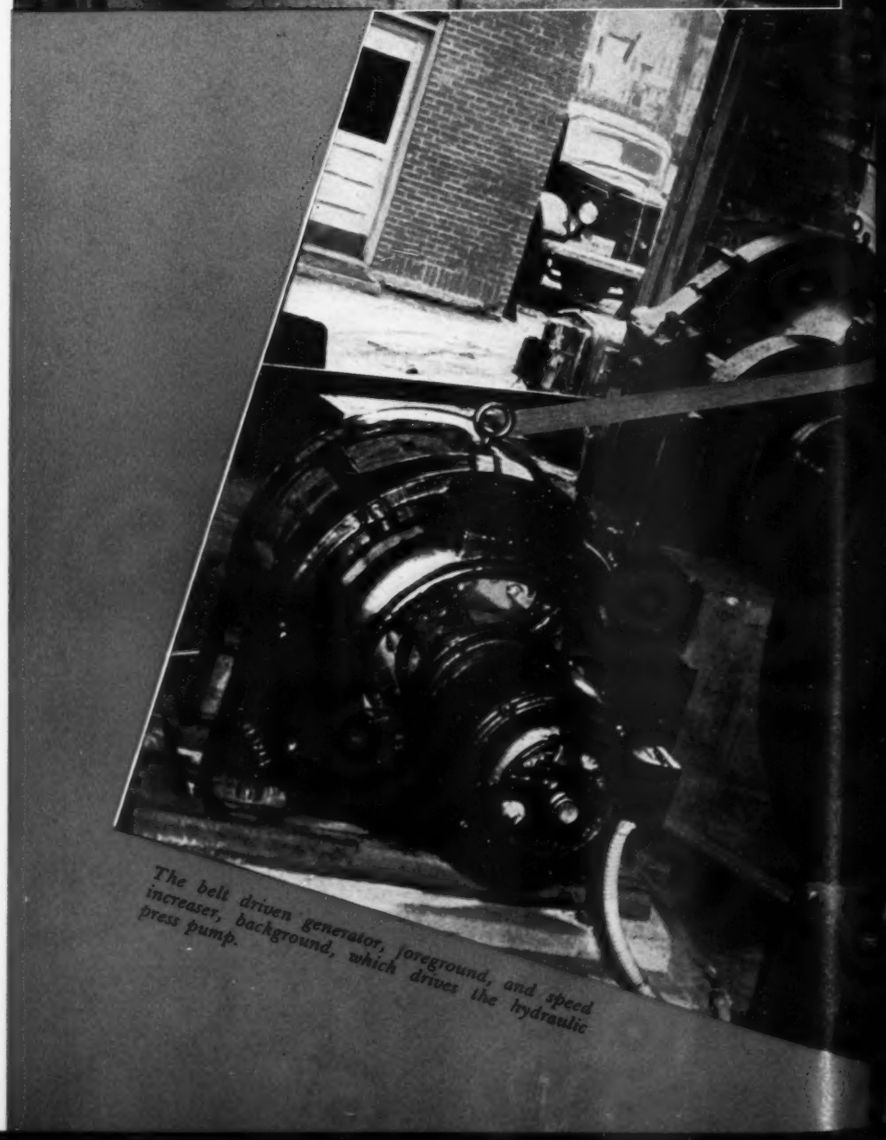
*Exterior of the Harcon Steel plant above. View, right, shows the F-M Diesel with various power take-offs.*

# HARCON IRON & STEEL

*By* ART MICHEL

THE call is for metal—every last ounce of it—and this is the story of a company doing its utmost to supply that last ounce to the rehabilitation of this country's defenses. It is also the story of a remarkably efficient power plant paced by a Diesel engine wisely purchased, efficiently installed, and carefully operated.

The Harcon Iron & Steel Corporation of Boston, Massachusetts, and Portland, Maine, is a scrap metals reduction organization high in importance in the New England area. It operates two plants at Boston, but its third, at Portland, is the most recent and the subject of this article. Here, as you approach, you see the high neck of the magnetic crane, and you find it unloading the trucks that have driven in from a 100 mile radius with metal for the powerful maw of the hydraulic press. Old stoves, auto bodies, oil drums, and dozens of other shapes and forms of metal—these are heaped high in the yard, ready for their transformation into 400 pound cubes. At the railroad siding, hundreds of these cubes are seen ready for shipment by rail and freighter.



*The belt driven generator, foreground, and speed increaser, background, which drives the hydraulic press pump.*

In the yard, you stand by the pit into which this metal is thrown by expert handlers who know just how much to give to each stroke of the plungers. This pit is about 10 feet long, 5 wide and just as deep. Look up and see the operator at the air controls. He presses a valve and from the end of the pit a 6-ton block of iron and concrete slides out as a cover. More levers are thrown. Below the cover, a plunger comes forward to press the metal to within about 30" from the end of the pit. Into this space from the side comes another plunger, pushing the mass into a corner. Finally at 2500 lbs. pressure a final plunger emerges from below, pressing upwards against the cover. By this time the huge, indiscriminate heap of metal is a neat bale, and a gentle nudge by the retreating cover pushes it out of the pit, now ready for more.

This impressive display of power originates in a 180 hp. Fairbanks-Morse Diesel which is direct-connected to a three-piston, double-acting Logeman hydraulic pump. Even if this were all the Diesel did, operating figures and reliability would be plenty to interest us. But between the Diesel and the hydraulic pump are two power takeoffs, and the combination of all of these is the answer to many companies who feel that their power problems are too complex to be unified and solved by a single Diesel engine.

Look at the photograph—see what Harcon Iron & Steel has done with its one 180 hp. Fairbanks-Morse Diesel. Off the flywheel and to the right is a belt-driven Fairbanks-Morse generator and exciter—the source of electric power for the inside and outside lights at the plant; for the electric start, and sometimes for charging the magnets of the cranes. Then off the sheave and to the left, a belt-driven air compressor provides power for the levers which control the hydraulic press—and for the plungers of the press itself as they are drawn back from their hydraulically powered blows at the metal. The shaft then proceeds through an outboard bearing, and is coupled to the Link-Belt speed increaser by a Waldron Coupling, designed to withstand the shock of the pump piston rods upon the shaft which drives them.

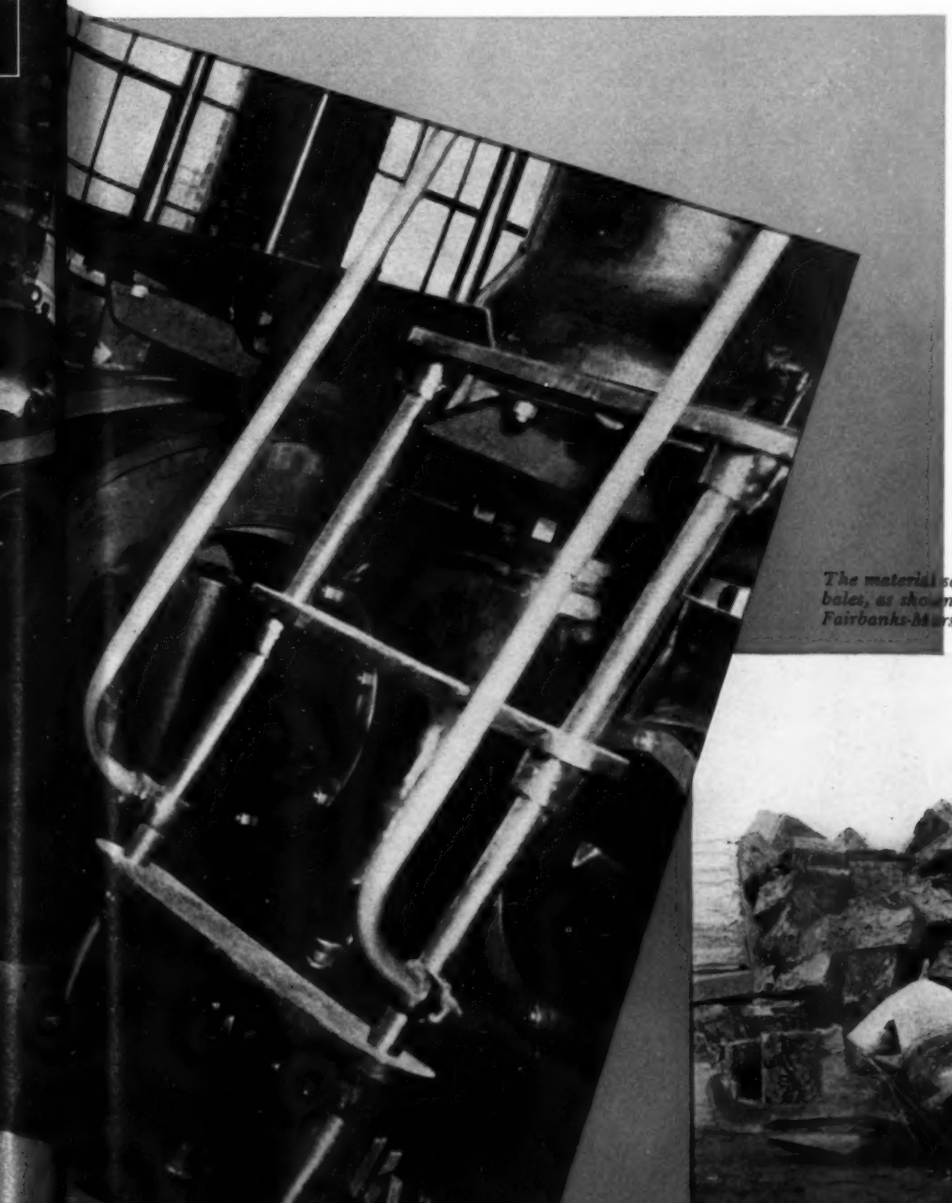
Altogether, it's a power setup in which the Diesel does the entire job. A glance at the machinery foundations convinces you that Harcon Iron & Steel spared nothing to make the installation as solid and well designed as possible, and the company is being repaid for it by the resultant savings in power costs which the Diesel brings.

Choice of the Logeman hydraulic pump was influenced by the steady job this pump was doing for the owners in the Boston area. But as Portland was their first Dieselized plant, the owners had to rely on the claims for the Diesel in general for being both extremely reliable and efficient. It is a slow-speed Fairbanks-Morse 2-cycle engine offering open head combustion, solid injection and back-flow scavenging and in this installation turns at 360 rpm.

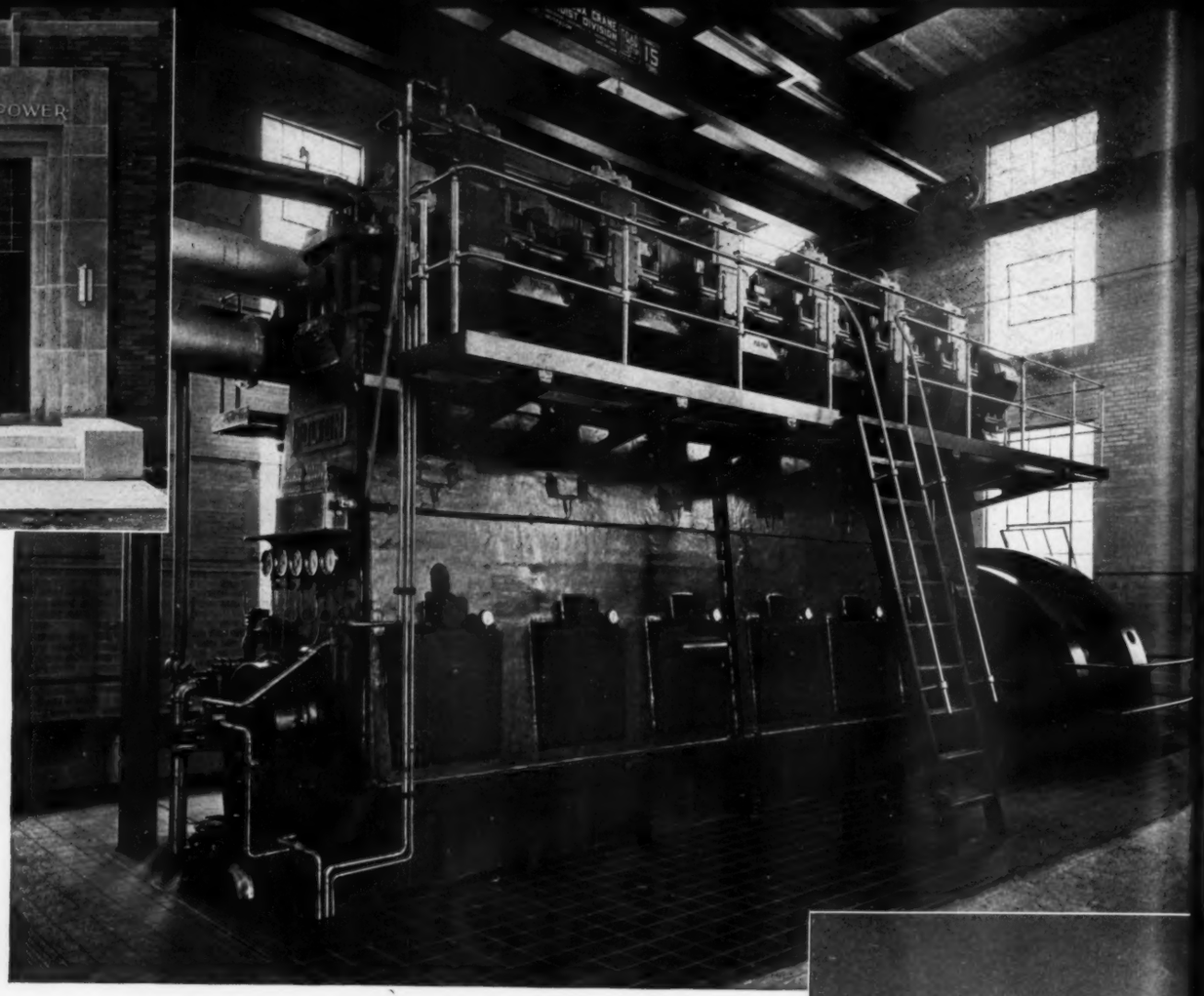
What with its power takeoffs, the operation of the entire plant depends solely upon the Diesel—and operations have *not been mechanically* interrupted for one moment since the plant opened fifteen months ago.

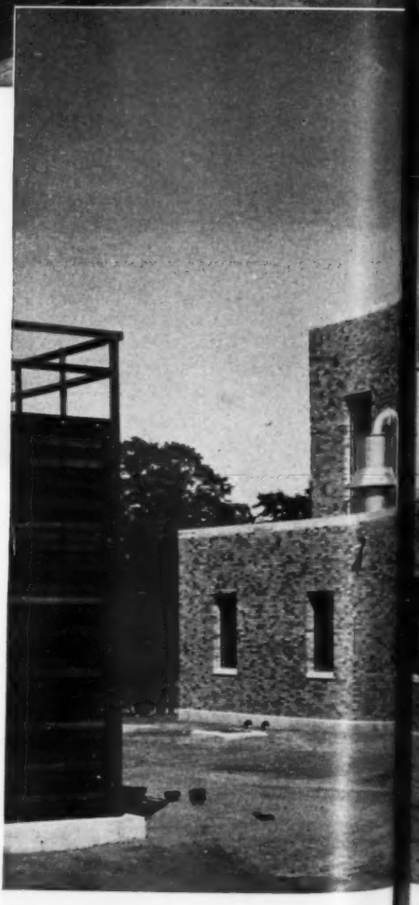
It is seldom that you can stand alongside a Diesel and see about you all the immediate effects of its power. You can do this at the Harcon Plant, where the engine, the generator, the compressor, and the hydraulic pump combine to produce an overwhelming source of limitless power well-directed and well-mastered.

And as if that were not enough, the sound of just a few blows of that hydraulic press, as Harcon Iron & Steel continues its important job, adds convincingly to the impression that men with real engineering brains have put together a compact engineering masterpiece.



*The material seen center, foreground, is reduced to compact bales, as shown, in a hydraulic press, powered by a 180 hp. Fairbanks-Morse Diesel.*





# ALGONA, IOWA

*By* GLENN C. BOYER*

ALGONA, county seat of Kossuth County, Iowa, is the center of an extremely prosperous agricultural territory in northern Iowa. This agricultural prosperity provides the basis for the progress of Algona, and indirectly for the excellent development of the community's municipal electric utility.

Faced with the problem of providing additional capacity in its Diesel generating plant, the city found itself with a plant built in the heart of the business district to which additions could only be made by taking over part of the adjoining city hall and fire station. An engineering examination of the existing power plant building showed it to be structurally unsound and, consequently, a large expenditure would be necessary to make the building safe. It was found upon further study that the power plant additions needed, together with the building changes required, would cost somewhere in the neighborhood of $171,000, while an entirely new power plant could be built on a new site, a new 1500 hp. engine and generator

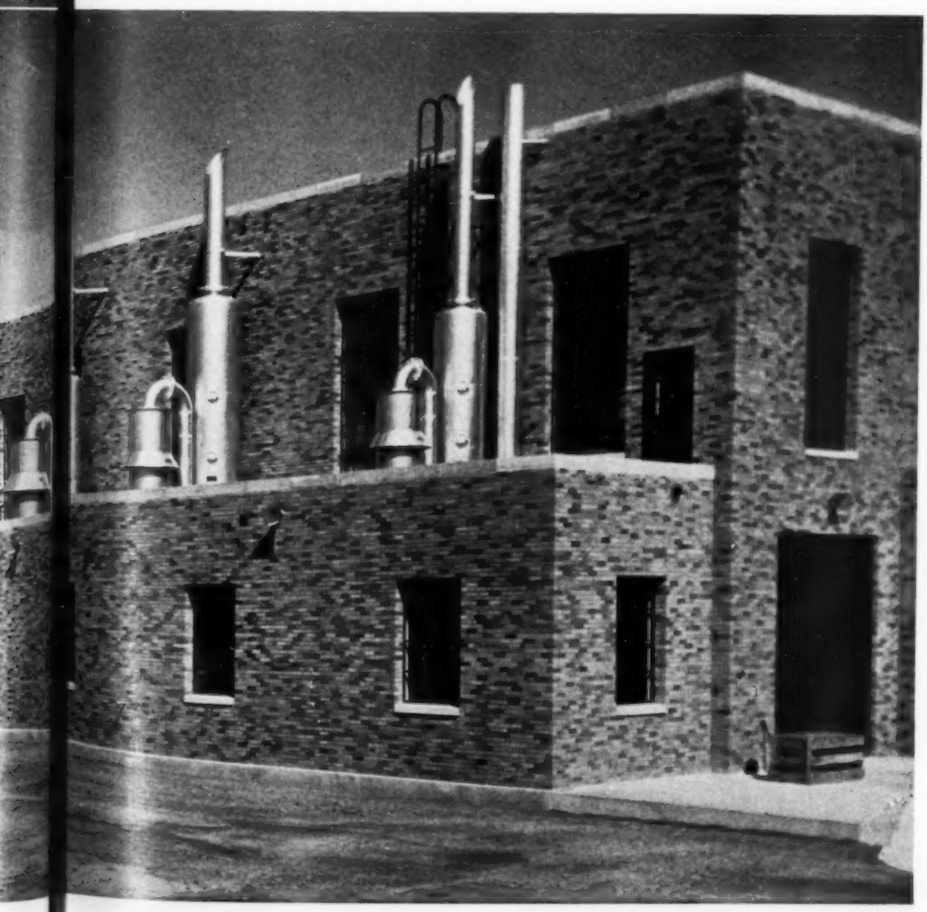
* *Associate Engineer, Burns & McDonnell Engineering Company*

purchased, and three of the existing units moved and reinstalled in the new location for $250,000. Furthermore, the existing power plant building could be salvaged for other municipal activities, and no modifications would be required in the existing city hall and fire station. The decision was made to move the power plant.

The city owned a site on the edge of the city only a short distance from the existing power plant. Due to the character of the site available, and the location of one well and other structures on the existing ground, it was decided to secure a group of adjoining lots and three small houses in a very run-down condition. The property was purchased, the houses disposed of, and the site graded to receive the new power plant.

In this construction schedule, the first step was to purchase the generating equipment, as well as the cooling tower and switchgear for the new power plant. Concurrent with the purchase of this equipment, grading of the plant site was undertaken. The engine, switchgear, and cooling tower were purchased on June 27, 1940, and the contract for the power plant building was let on October 1, 1940. Between the time the equipment was purchased in June and the contract for the building was let on October 1, the site for the power plant had been prepared, and the building contractor was ready to start work on the building immediately following award of the contract. By November 3, 1940, the excavation for the building had been completed and a start was made on the building foundations. It is not necessary to follow in detail the construction progress. The plant was complete, and the new generating unit tested on September 9, 1941. Plans are now under way for moving the equipment from the old plant shortly.

What is this new station like? How does it differ from many other Diesel-electric generating plants which have been constructed in recent years? These two questions have been on the lips of every operator, plant superintendent, and city official who has journeyed to Algona to examine this plant about which considerable discussion has arisen in that state.



*Left to right: Front entrance to the new Algona, Iowa, municipal power plant; first unit to be installed in the new plant, a Fulton 1500 hp. Diesel; rear view of the plant showing Marley cooling tower, left, and American Cycoil air filters and Burgess exhaust snubbers.*

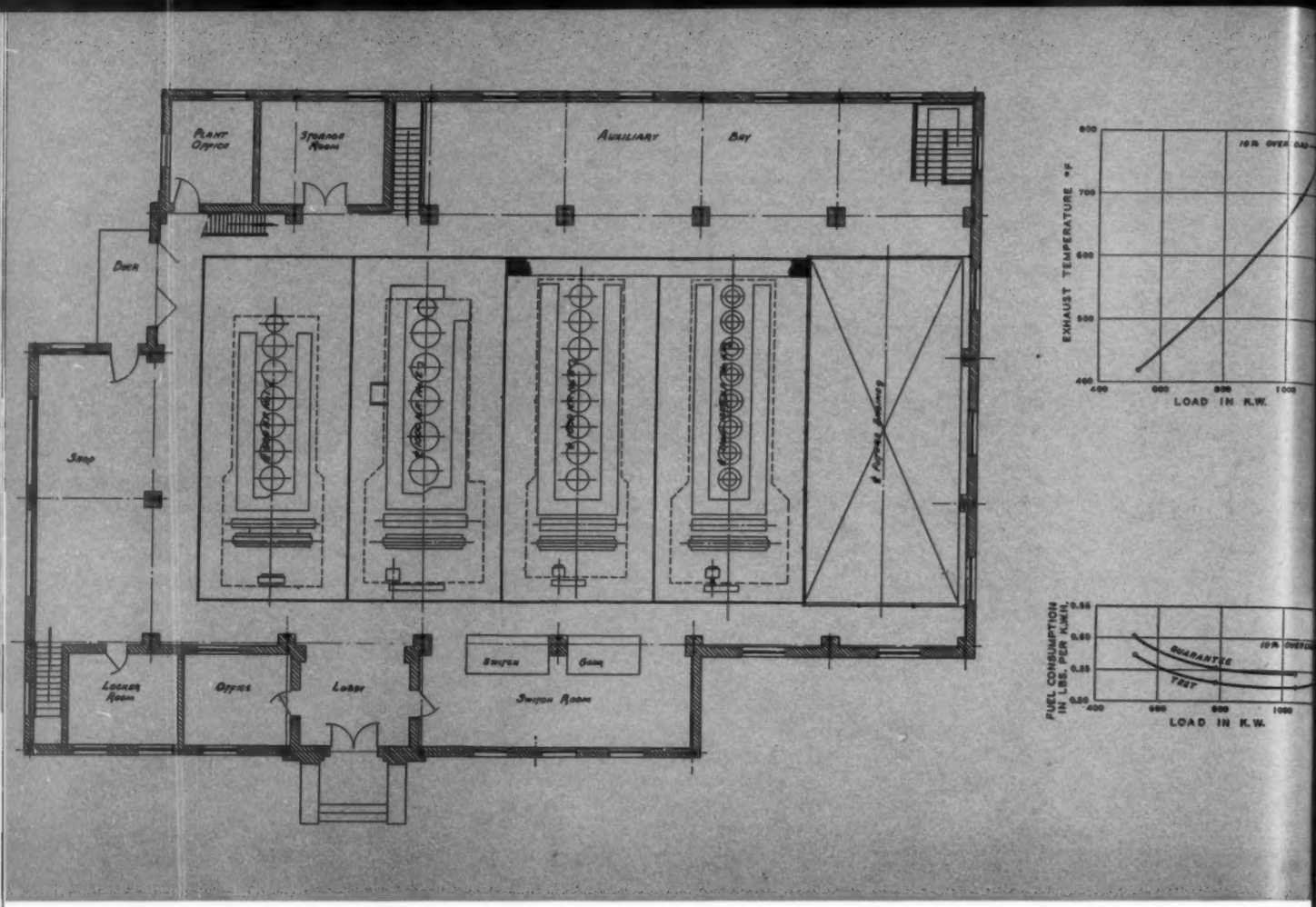
And, invariably, every visitor has come away from the plant realizing that it was different, but unable to settle in his own mind just why it was different.

The plant is, indeed, different in many respects from most Diesel generating plants. Different because of its roominess, different because of the many innovations in design which have been incorporated by the engineers. It represents the culmination of many years of experience and experimentation on the part of the designing engineers together with the cooperation of Mr. C. U. Pollard, superintendent of municipal utilities at Algona, who checked the design from the viewpoint of the operating staff to insure that operation would not be impaired in any respect by the construction proposed. It is this whole-hearted cooperation of designer and operator that has created an outstanding power plant.

The new engine installed in the plant was furnished by the Fulton Iron Works Company. It is a 1500 hp. unit having six cylinders, operating at 225 rpm., provided with oil cooled pistons and is of the four-stroke cycle type. Cylinders are 23 x 28 inch, and the unit is modern in every respect. Fuel injectors are cooled with fuel oil. A Woodward governor is used on this unit, and the barring over gear is air operated. Direct connected to the engine is a General Electric alternator rated 1,318 kva. at 0.8 pf. or 1,054 kw. The exciter is a 20 kw., 1,450 rpm. unit and is driven by a silent chain from a shaft extension on the alternator.

The cooling water system installed in the station is of the closed or double-circuit type. Piping for the cooling water system is divided throughout, and the cooling tower is divided so that either half of the cooling tower can be shut down for maintenance or repair without interfering with the cooling of the engines in operation. This design of the cooling water system permits addition to the cooling tower in the future without interfering with the operation of the power plant in any manner. Jacket cooling water is treated with a zeolite softener.

Six Ingersoll-Rand cooling water pumps are stalled in the plant at the present time, three for the raw water side, and three for the jacket water side. The raw water pumps consist of one 400 gpm. and two 850 gpm. units having an operating head of 35 feet. Shut-off head is 45 feet. The jacket water pumps consist of one 450 gpm. and two 825 gpm. units operating at 65 feet total head with a shut-off head of 85 feet. The head-capacity characteristics of



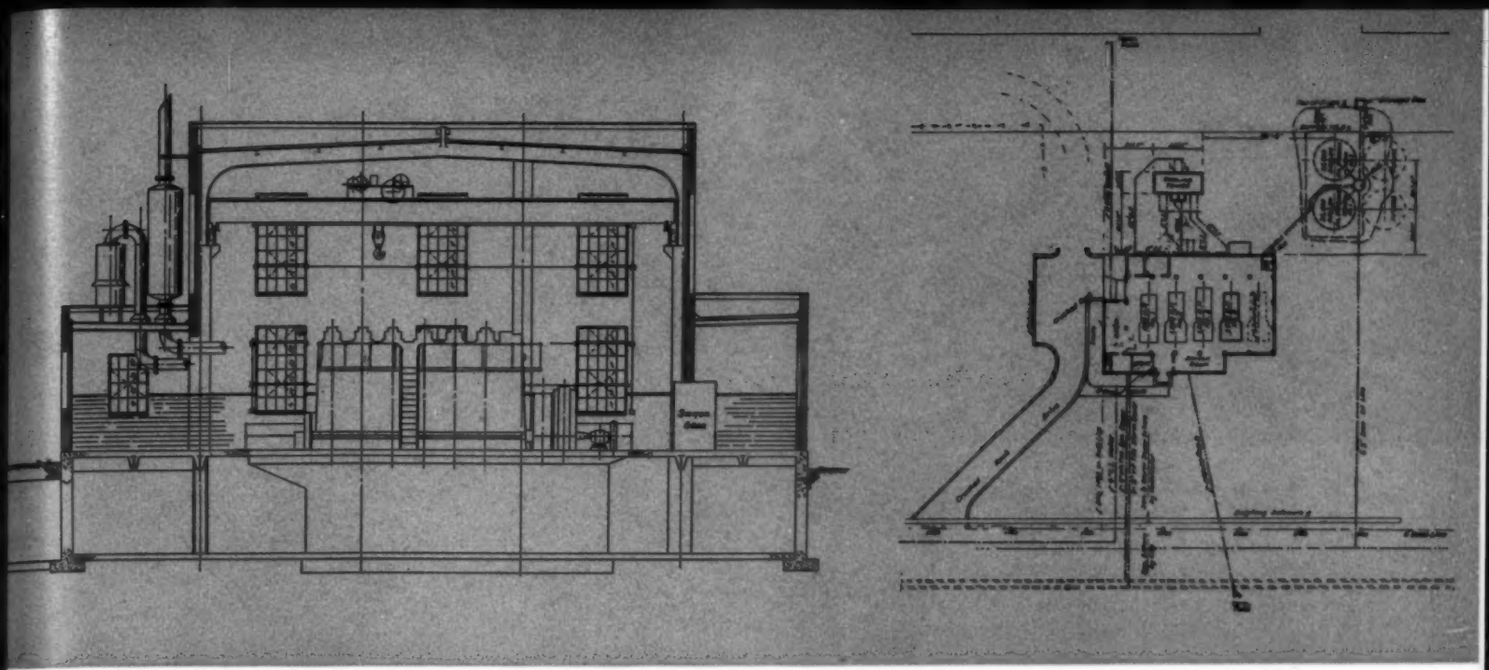

*Plan of engine room showing location of the four Fulton Diesels and provision for a future engine.*

the various pumping units as well as their sizes were selected after a thorough study of the cooling requirements of the station. One large and one small pump on either the raw or soft water system is sufficient to develop the maximum capacity of the cooling tower with a 15 deg. temperature rise.

The cooling tower has a rated capacity of 10,000 Btu. per hour, and since it is divided into two equal sections, each side will produce 5,000,000 Btu. of cooling effect. The tower is of the induced draft type and is equipped with a separate motor driven induced draft fan for each half. The cooling tower basin is divided so that either half may be shut down and cleaned out periodically. The cooling coils are also arranged into two sections so that either half of the cooling coils may be taken out of service for maintenance or repair. The cooling tower was furnished by the Marley Company. Building heating is accomplished by the use of jacket water from the engines which is piped to eight unit heaters installed in the building. The unit heaters were sized for the heating load to be encountered under most conditions.

In the event of unusually severe weather, a small auxiliary boiler having a capacity of 330,000 Btu. per hour is available to supplement the jacket water heat available. This boiler will be used during the coming winter for heating the building when the existing unit in the station is shut down and before the other three units are installed and put in operation. Fuel is stored in two 25,000 gallon underground reinforced concrete tanks located adjacent to the plant. Space is available for two additional tanks of the same size which may be required in the future. Oil is pumped from an unloading station located on a railway siding approximately 1,000 feet north of the plant. The new Westinghouse switchgear is of the metalclad type to insure safety and ease of maintenance and operation. The gear consists of a synchronizing panel, four generator sections, one totalizing section, and seven feeder sections. Provisions have been made on the board for synchronizing with the old plant, and this feature will be maintained since two small units will not be moved from the old station but will be left for standby and emergency service in that location. Breakers are of the oil type with an interrupting capacity of 50,000 kva. per breaker and a one-second current carrying capacity of 20,000 amperes. All breakers are electrically operated, and all breakers are removable from the rear of the switchgear. Provisions have been made in the back of the switchgear for inspection and maintenance of all breakers.

Station auxiliary power is provided through two transformer banks, located in a room directly beneath the switchgear. One bank is connected directly to one feeder position on the switchboard, and the other, or auxiliary bank is connected to an outgoing feeder circuit. All auxiliaries operate at 220 volts, and the electrical supply to auxiliaries is so arranged that the failure of either transformer bank, supply circuits from transformer banks to load centers, or load centers themselves will not shut down the station. In other words, auxiliary power will be available at all times when the generating equipment is in operation. Lighting for the plant is provided through a separate station lighting transformer. An emergency lighting system has also been installed in



*Lateral section through the building showing engine, intake, and exhaust arrangement. Right: Plan of the power plant and grounds.*

the station and is supplied from the 120-volt battery used for operating the switchgear. This emergency lighting system is arranged to come on automatically in the event of the failure of the normal alternating current lighting system. The power plant building proper consists of an engine room 51 x 96 feet. On the east side of this building is a single-story section housing the switchgear, superintendent's office and wash room. To the south is a single story shop. Along the entire west side of the building is a single story structure with provisions in it for an office for the operators, a small-parts storeroom, and space for the two Quincy starting air compressors, Honan-Crane lubricating oil conditioning equipment, and other miscellaneous auxiliaries. Circulating water pumps are located in the basement on this section on the west side of the building. American air filters and Burgess exhaust snubbers are located on the roof of this section.

The construction of the engine room is unique in that the conventional roof trusses have been replaced with rigid frames which permit a lower building height for the same clearance of the crane hook. The appearance of the engine room is also much improved by this type of construction. All floors in the engine room are of cantilever construction, either being sections cantilevered from the engine foundations, or cantilever floor sections supported from the building at the engine and generator ends of the units. This construction eliminates all beams and columns necessary for supporting floor slabs in most conventional designs, and this elimination of beams and columns permits the installation of circulating water, air and oil lines with a minimum of interference. The interior of the building was faced with tile for the first six feet above the operating floor and glazed brick for the remainder of the wall.

A 15-ton Shaw-Box crane is installed in the plant to facilitate installation and maintenance of equipment. The crane is provided with a motor-operated hook, and the truck and bridge are manually operated.

Tests recently conducted on the 1500 hp. unit gave the following data with the generator operating at unity power factor:

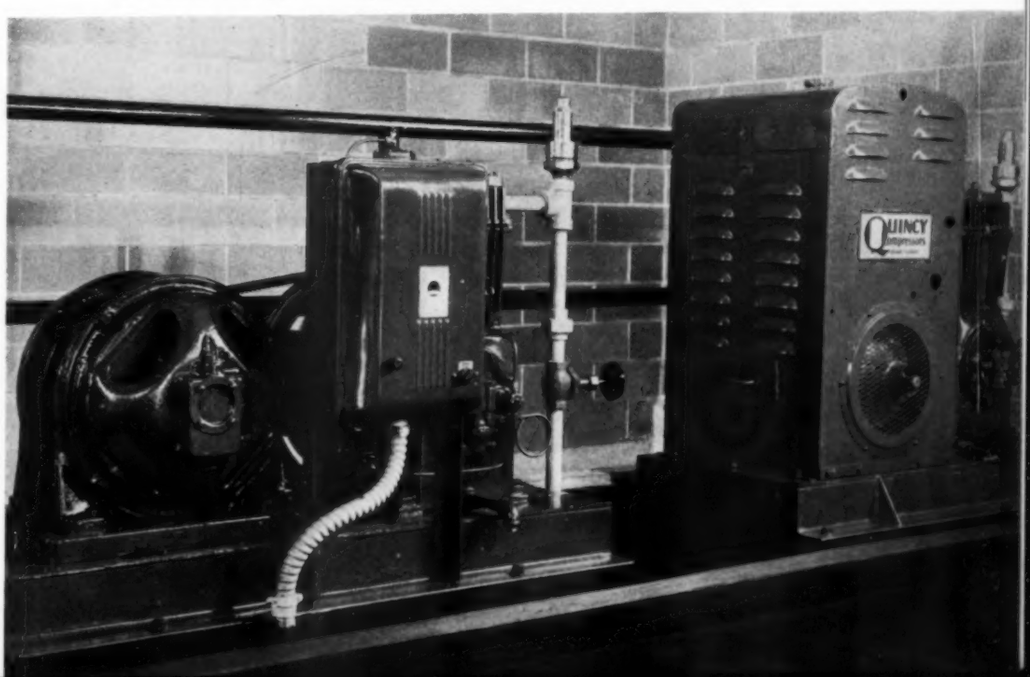
| *Average Load kw.* | *Btu. per kwh.* | *Duration of Test* |
|---|---|---|
| 529.7 | 10,883 | 2 Hours |
| 786.7 | 10,083 | 2 Hours |
| 1,052.9 | 10,009 | 2 Hours |
| 1,166.3 | 10,195 | ½ Hour (10% overload) |

Pressure drop through the Cycoil air filter and air intake averaged 5 inches of water throughout the tests.

Three units from the old plant are to be moved into the new station in the near future in such sequence as not to interfere with the reliability of the community's electric supply. The units to be moved consist of three Fulton engines; an eight-cylinder 1,000 hp. unit, a 1,000 hp. five-cylinder unit and a 600 hp. six-cylinder unit. They will be moved in the order given. When completed the entire improvement program will represent an expenditure of $250,000, all of which was paid for from plant earnings.

The entire design of the plant as well as the supervision of its construction and the installation of the new equipment was done by Burns & McDonnell Engineering Company.

*The motor and gasoline engine driven Quincy starting air compressors.*



*Bow view, above, and stern view, right, of the unusual 30-year-old towboat recently converted from steam to Diesel propulsion and now ready for many more years of profitable service.*

# ANCIENT STERNWHEELER CONVERTED

## Diesels Save $40 Per Day

PROBABLY one of the most unusual marine Diesel engine installations in the country is down here in the deep South at Demopolis, Alabama. Here, the Demopolis Lumber Company operates the *James L. Hale*, a 60-ton stern wheel river towboat, to move logs by barge to their mill. The boat was built in Louisville in 1909.

For thirty years, this big 75′ x 16′ all wood work boat used steam to power its 10-bucket board paddle wheel which is 10 feet in diameter and 14 feet wide and, for thirty years, it cost the company a neat $45 a day to operate.

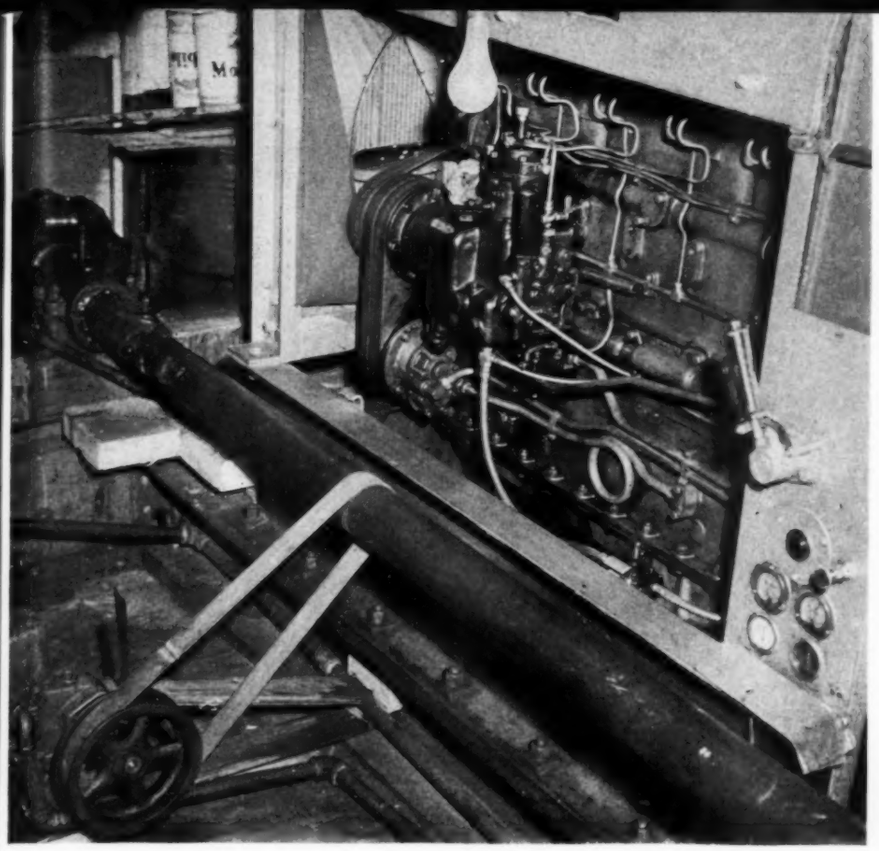
In July, 1939, the company decided that it was time to cut down on costs and consequently installed a 112 hp. Cummins Diesel. This engine is an industrial power unit equipped with a marine reverse and reduction gear. Its radiator cooling is most rare in the marine field.

Instead of an operating cost of $45 per day, the Diesel does the same work today for only $5. And, in these days, a saving of $40 per day isn't hay, as the saying goes. To top this, the boat's performance was greatly improved.

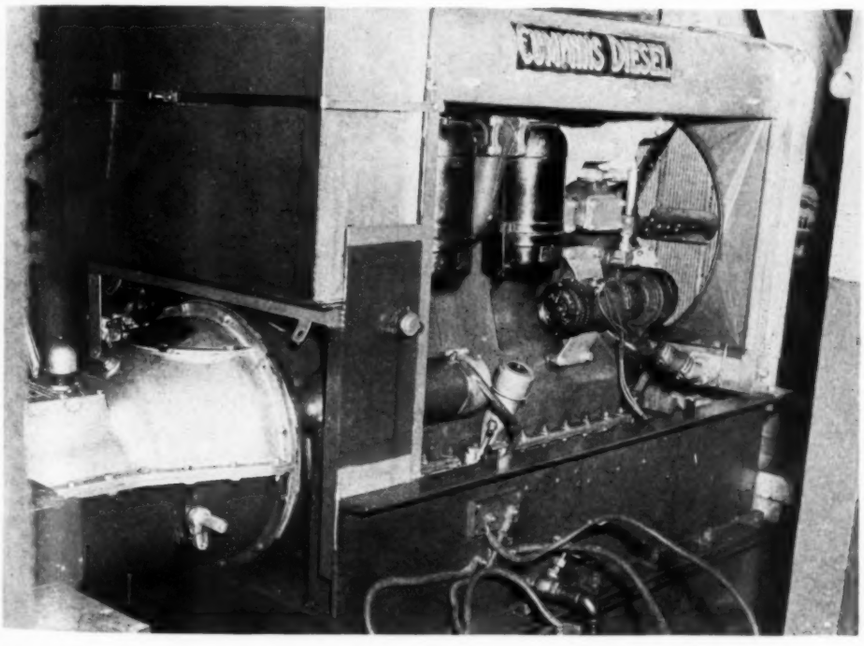
Usually, the old square-deck veteran which has a model bow and goose stern pushes two large barges, each of which carries 35,000 feet of lumber. It makes the rounds on adjacent rivers visiting and loading from the company's various riverside cold decks within a 75-mile radius of Demopolis. Capt. J. D. Wheatly says, "I can't tell the difference between steam and Diesel propulsion. This Diesel gives us the same speed as steam power when we push two barges and with one barge it is faster." The usual loaded speed of the boat is four mph. Its speed light is eight mph. up to ten to twelve mph. downstream. One trip of sixty miles took 5½ hours.

When the steam engine was still being used, the company had a constant expense even when the boat was not operated, as they hardly ever let the boilers cool down. When it was working, the boat consumed from four to five tons of coal in a thirteen hour day which cost from $3 to $3.80 per ton. Two firemen were needed alternating six hours on duty, six hours off, day and night. In addition to this, a great deal of time was lost in a week as it took an hour and a half to build up sufficient steam pressure to start each day's operation. Considerably more time was lost in transferring coal to the boat as it had to be loaded and unloaded from barges to get it aboard.

In contrast to this, fuel for the Diesel is pumped directly into a pair of fuel tanks located in the hull of the boat, which hold a total of 1500 gallons. Neither is time nor money lost when the boat is not worked. Al



*The industrial type Cummins Diesel with radiator cooling, installed in the "James L. Hale."*




*Intake side of the Diesel, showing Donaldson air cleaners, Leece-Neville generator and starting motor, and Twin Disc reduction and reverse gear.*

the new Diesel starts instantly with standard electrical equipment, there is naturally no need to run the engine when the boat is not working. This reduces expenses from both fuel consumption and fireman's wages. So great have been the savings that Sam Jackson, manager of the company, recently said, "If I had had Diesel engines on my boats from 1920 to date, I would have saved enough money to buy a large twelve story city building." The engine is set up about twenty feet from the stern and is installed at right angles to the keelsons.

Both the engine and the 2½:1 Twin Disc reduction and reverse gear are mounted on a pair of 10″ "I" beams, 12′ long. A 36′ shaft from the reverse gear flange is supported at its far end by an outboard bearing. The end of this shaft mounts an 8″ gear wheel which turns a second 40″ dia. gear wheel.

This 40″ gear wheel is mounted on a shaft which extends through the wheel and across the entire beam of the boat. It passes parallel to the engine about two feet behind it toward the stern. Both ends of this shaft mount 12″ sprockets and with a chain having 19″ centers drives to a pair of 4′ diameter sprockets mounted on the paddle wheel. The chains are 4″ wide and have 6″ link centers. With the engine turning 1200 rpm., this arrangement of the power transfer equipment gives the paddle wheel an approximate speed of 24 rpm. The paddle wheel bucket boards are 20″ wide.

A 2″ x6″ water pump is driven by a small flat belt off the main driveshaft. This lifts water from under the boat and circulates it through the reverse gear bearing. Use of the Twin Disc reverse and reduction gears gives the boat an instant reversal of power when needed. Fuel from the storage tanks is pumped manually into the twenty gallon day tank which comes as standard equipment on the engine. There is no remote control equipment and the pilot's needs are transmitted to the engine room by bell signals.

Capt. J. D. Wheatly acts as engineer and George Phillips is pilot. The boat's usual crew includes two deck hands and a female cook, all colored.

The pilot house is 8′ x 16′ with the rear half screened for the captain's quarters. The pilot's quarters, a room 7′ long x 8′ wide, is in the rear of the pilot house.

A 10′ x 16′ bunk house for the deck hands is in the forward end of the boat on the deck level. Behind this are the dining rooms, kitchen, cook's quarters and the engine room. A 2′ space between these last two rooms house the batteries for a 32-volt, 750 watt Delco plant.

The boat's operation is rather intermittent and no accurate records on fuel consumption are kept. Captain Wheatly said, "I was opposed to replacing our steam power with a Diesel because I didn't know a thing about Diesel engines. I don't worry about it any more because we haven't had a bit of mechanical trouble or starting difficulty. I like it fine."

# DIESELS CREATE MAGIC ESTATE

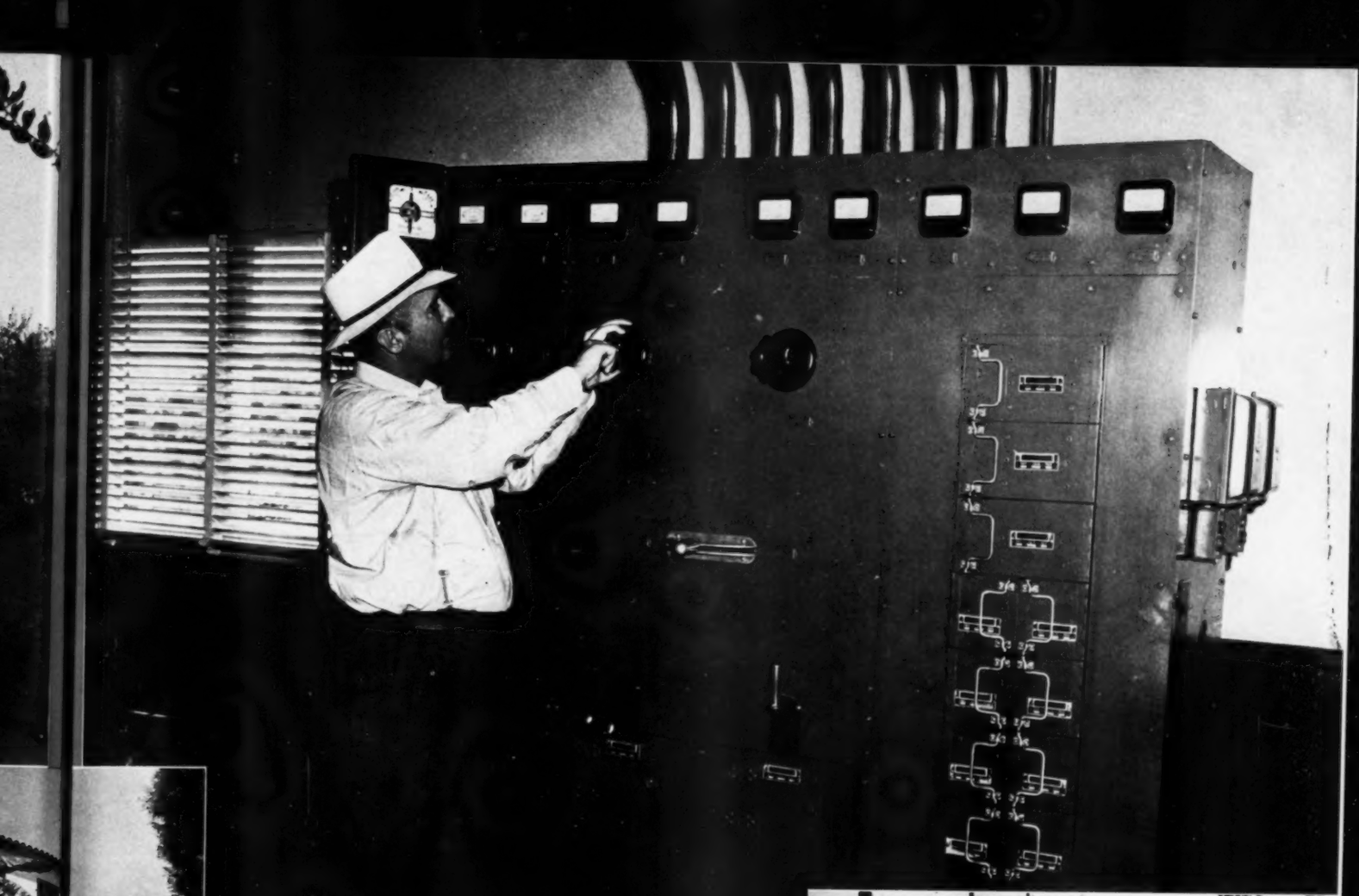
*By* JIM MEDFORD

IF Aladdin riding the Magic Carpet of Arabian Nights with his wonderful lamp now came to Southern California, it's a sure thing he would give a wide berth to a spot on the ridgepole between Whittier and the Pomona Valley, where, on a twenty-five-acre estate, its owner has more invisible servants at his command than the mythical little fellow ever dreamed of. Stout iron gates set in massive brick walls open and close at a spoken word into a little metal box while, at the end of the driveway, a giant hand reverses your car without effort on the part of the driver.

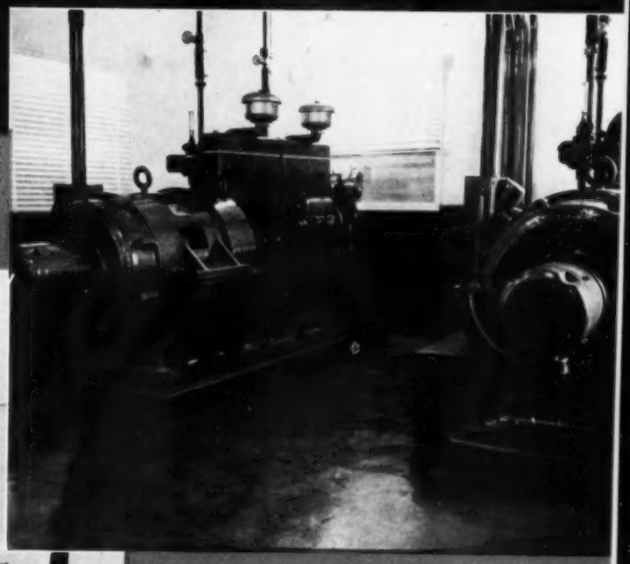
Inside the beautiful home fifteen hundred feet above the valleys on either side, adequate lighting, healthful heat, and air at just the right temperature is available at the movement of a finger. And if you are lucky enough to be asked to dine, you will more than likely be served with domesticated wild fowl or a super barnyard chicken that matured under ideal conditions. They'll also be done to a toothsome brown by the same unbelievable power. The same magic through short wave station W6TWR gathers the world wide news or transmits communications to equally distant parts by the slight movement of a hand on a metered dial. Truly, an Old World's conjurer's tricks are a poor second to this 20th Century masterpiece of modern engineering.

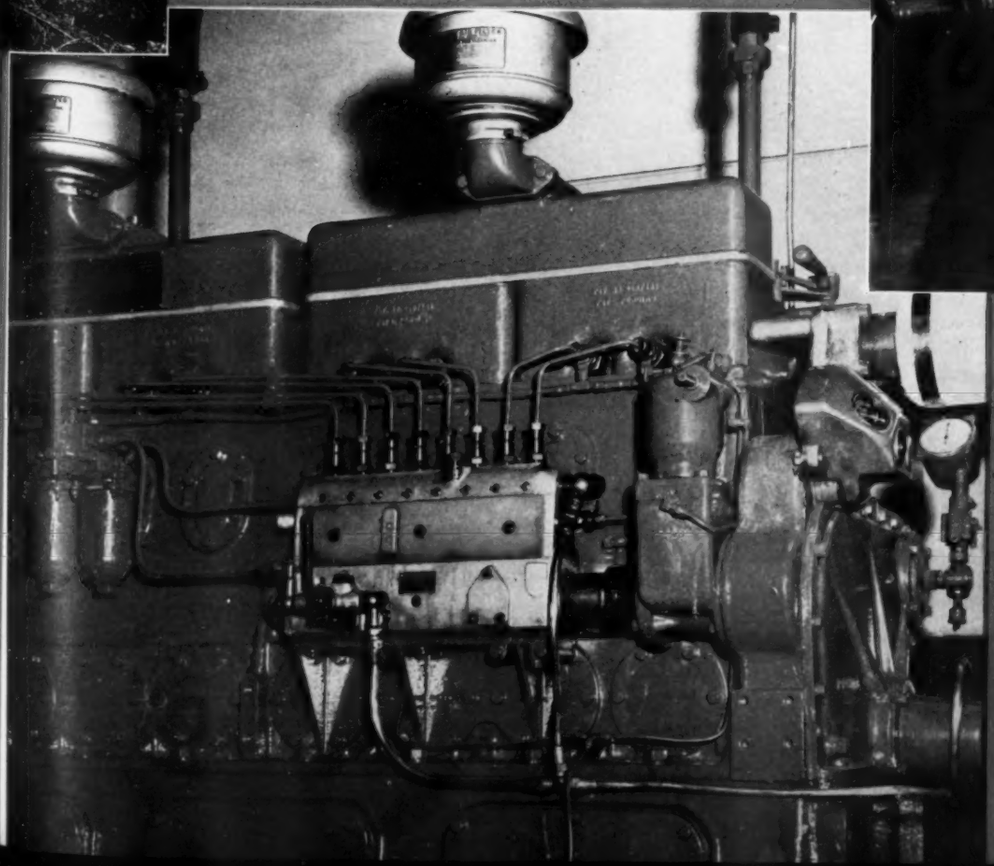
The owner-genius of this exceptional domain at the end of Skyline Drive is S. M. Stoody, who conceived the unusual idea of installing twin Diesel-electric generating sets to supply the energy for his exceptional mountain home. Housed in an owner-designed 20′ by 30′ concrete building, buff with red tiled roof that harmonizes with other ranch structures, of many unusual features, there are two that are particularly outstanding: it is also air-conditioned, and vibration is isolated by heavy concrete engine foundations.

Principal equipment items are: two Superior 150 hp. at 1,200 rpm. Diesels direct connected to Westinghouse 3 phase, 60 kw. A.C. generators and exciters; a Fairbanks-Morse 2 cylinder, 20 hp. Diesel coupled to F-M 12½ kw. generator and exciter for standby power; Leece-Neville starting motors; Pierce governors; Skinner fuel oil filters; fuel oil transfer pump by F-M; fuel and lube oil by Standard Oil Co.; lube oil filters are Purolators; Air-Maze air filters; Delco batteries; Square-D switchboard; Instruments by G.E. and Westinghouse.



*Upper left: This charming estate has every electrical convenience all operated from its Diesel generating sets; note unique radio aerial. Left: The "Power House," with cooling tower and exhaust stacks.*





*Top view: Owner, S. M. Stoody at the Square D switchboard. Above: Interior of the "Power House" showing the two Superior Diesels and Westinghouse generators. Left: Operating side of the Superior Diesel showing American Bosch injection pump, Air Maze air filters, Pierce governor, and Skinner fuel oil filters.*

# OVERHAULING YOUR DIESEL UNITS

Part 1

*By* R. L. GREGORY*

*Author's Note: Included in the correspondence received by this department of DIESEL PROGRESS, there are inquiries from readers relative to methods and procedure of periodical inspection of plant units. We feel that this is a subject of importance to all Diesel engineers, and especially during this period of exceptional demand on our power plants. The writer will, therefore, cover the subject in a series of articles, giving data and illustrations which may be applied in general to all Diesel plants and equipment.*

THE most important and interesting problem facing the supervisory and operating personnel of a Diesel plant is the inspection and overhauling of the engines and equipment.

Manufacturers of Diesels and Diesel equipment are in accord with the idea of an annual inspection and reconditioning of their units in the field, and are always willing to supply a capable engineer to the user, whose duty it is to supervise such reconditioning, especially in plants where the customer does not have experienced personnel and equipment to do this work. The old idea of letting an engine go until necessity requires this reconditioning went out of date with the horse and buggy. Modern engineering practice should, and does demand that equipment of such design and import as our present day Diesels receive an annual inspection. We are all aware that the Army, Navy, Air Force, our great Transcontinental Air Lines all insist on inspections of their equipment after definite periods of operation. How much more important it is, therefore, that we, who are operating the Power Plants of the nation which are the backbone of Industry and Defense, keep our equipment in the best possible condition by adopting a systematic inspection program.

Some engineers may take exception to the idea of an annual inspection and reconditioning of their units, basing their argument upon the fact that they are practicing "Preventive Maintenance" on their various units, and hence see no necessity for an annual inspection. That depends a great deal on the operating schedule of the units involved. If the plant is equipped with sufficient capacity in a number of units, so that the outage of any one unit for a period of time will not interrupt service should an additional unit break down, most of this inspection can be carried on in routine maintenance. But in the present situation, most of our plants are not blessed with such a condition and it is these plants to which I refer.

There are several reasons why an annual inspection is most desirable. In the first place, it gives the supervisory and operating personnel ample time to get into the more important problems of bearing conditions, clearances, liner reconditioning or replacement, overhauling of fuel systems; in short, a chance to get at the parts of the unit which can not be worked on in a few hours, but which will take days to do and do right. Secondly, it also provides an opportunity to check all parts of the unit and ascertain where the greatest wear and tear has occurred during the past year's operation, and to make any adjustments or improvements which they deem will correct this condition during the coming year's operation.

Then, last but not least, comes the most important reason of all. The majority of members of the engineering profession, and in that class I include not only the designers and manufacturers but the men in charge of daily operation, are men with a thirst for knowledge. There is no better education for the operating and maintenance personnel than actually to get into the engine, dismantle it, inspect it, make the required repairs, reassemble it, make the various adjustments and put it back in operation. Most men feel a certain justified pride in such accomplishments. Operating instructions, blueprints, and literature are all vital to such work, but they are the products of human endeavor, hence subject to error occasionally as we have found. The best way to get acquainted with the why and wherefore of your Diesels, therefore, is to roll up your sleeves and personally delve.

The proper time and method for carrying on this annual inspection is a matter of opinion, which should be governed by local plant conditions. Because the natural tendency is toward increased demands upon your plant during the winter months, the writer prefers late summer or early fall inspection. That, of course, applies to plants without sufficient reserve capacity as before mentioned. But in any instance, the work of inspection and overhauling a Diesel should follow a systematic and well laid out plan, worked out some time in advance. Such a plan, carefully followed, will eliminate false moves and speed up the work of repairs.

When you have decided to overhaul an engine, your first consideration should be given to the equipment upon which you will have to depend to maintain service, while your unit is out of service. This should be in as good condition as possible to warrant any outage of any part of it, barring, of course, unavoidable accidents or breakdowns. Your next consideration should be the listing of all the parts to be inspected, the operations to be performed and selection of the necessary tools and rigging to do the job. If you have a tile, composition or concrete floor in your plant, this should be covered well with either a heavy grade of building paper and boards, pressed wall board, masonite or cardboard, in fact any material that will prevent oil, carbon and grease getting onto the floor. The tools should all be in good condition and conveniently arranged for those of the personnel who will work on the equipment. With these prearranged you are ready to begin the work of dismantling.

This routine also depends on the available space and personnel, so as not to interfere with the operating schedule but can be conducted in some such a manner as follows:

1. Remove all the cylinder heads and auxiliary piping, bolts and other equipment pertaining to them, placing them in rotation on the floor at one side of the engine. In so doing, be careful to arrange this material in such a manner that it will be easily identified when you

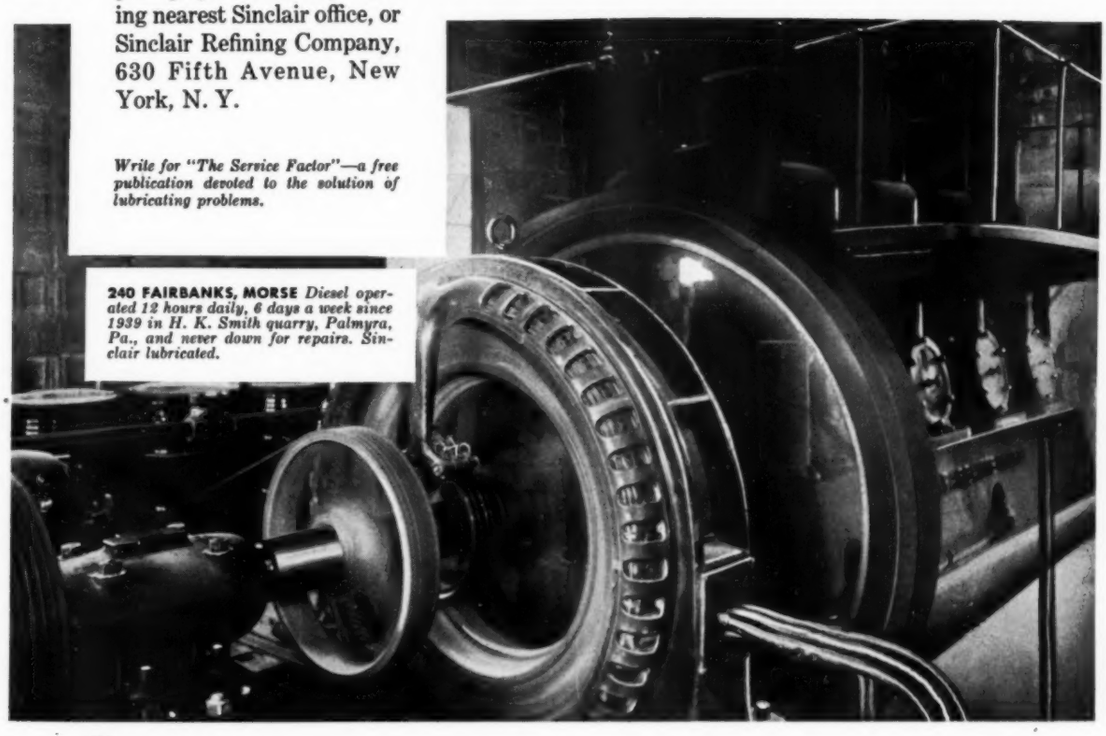
. . . . *And now please turn to page 54*

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

**ALL-OUT DEFENSE** effort imposes engine loads that cause breakdown if lubrication *fails*. For *safe* lubrication of *DIESEL ENGINES* there are . . .

**. . . SINCLAIR RUBILENE OILS** that *stand up* in continuous service and give full protection under emergency overloads. For perfect power seal and ring and valve-free operation try Rubilene. Details or lubrication counsel promptly obtained by writing nearest Sinclair office, or Sinclair Refining Company, 630 Fifth Avenue, New York, N. Y.

*Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.*

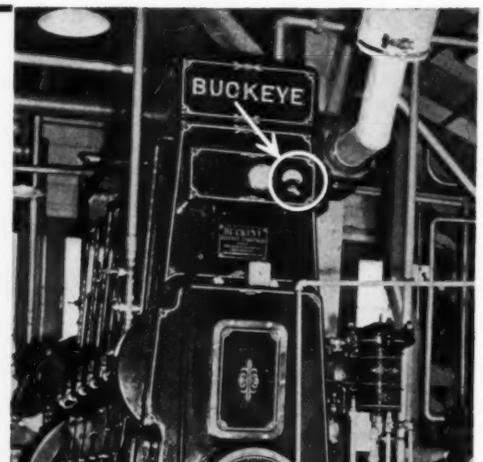


**240 FAIRBANKS, MORSE** *Diesel operated 12 hours daily, 6 days a week since 1939 in H. K. Smith quarry, Palmyra, Pa., and never down for repairs. Sinclair lubricated.*

# SINCLAIR INDUSTRIAL OILS

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • 1907 Grand Avenue, Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth




This six cylinder, 225 hp. Buckeye Diesel is the main power unit in the plant of the La Fourche Shrimp & Ice Company of Golden Meadows, La., on Bayou La Fourche, one of the ancient waterways of Southern Louisiana. The engine drives a 90 kw. generator and a 9" x 9" ammonia compressor. An engine-mounted front-of-board type Alnor pyrometer provides an accurate check on individual cylinder performance.

## "I Never Saw Anything Like The Care That Engine Gets"*

It is only natural that the engineer who decorates his engine so artistically and who completely dismantles his equipment once a year should insist on efficient performance. This Diesel operates continuously at full load, 24 hours a day, a year at a time, and always the Alnor pyrometer unfailingly indicates how well the engine is performing.

* See article in this issue.

***Insist on the best protection for your Diesel engine.***

*Specify or buy "Alnor"*
*Ask for Catalog*

Illinois Testing Laboratories Inc.
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*Manufacturers of "Alnor" and Price Instruments—Products of 41 Years' Experience*


## SUPERVISING AND OPERATING ENGINEERS' SECTION

. . . . *Continued form page 52* . . . .

come to reassembling it. Nothing is so sloppy when doing a job of this sort as to see these parts thrown haphazardly into a pile, without consideration as to identity.

2. While one group of workmen is dismantling the above mentioned parts, another should be removing the side plates or inspection doors in order to get at the crossheads, pins, guide plates, crank bearings, connecting rods, etc.

3. Upon completion of the above items, remove the pistons, placing them in rotation on the opposite side of the unit from the cylinder heads and far enough apart to allow a workman to move freely around them, if possible.

4. Next remove the wiper ring assemblies and place in a convenient manner for cleaning and checking.

5. By this time, most of the oil adhering to the above parts will have drained into the crankcase. This is an ideal time to clean up the crankcase during this inspection, for the oil can now be drained into your dirty oil storage tanks. By so doing, you will eliminate getting more foreign matter into the oil, while cleaning ports, etc., or reconditioning liners. After draining the crankcase, forget this phase for the time being.

6. The annual inspection period is an ideal time to inspect your generator stator and rotor coils. Regardless of how immaculate you may keep your plant, oil film will form on the generator coils after a period of operation. The thickness of this film depends upon length of operation between cleanings, amount of oil fumes present during operation, and the cleanliness with which you operate your units. This oil film also contains dust and dirt particles drawn from the surrounding air. The stator should be moved sideways on the sole plates until the rotor and stator coils are accessible for cleaning.

When you have proceeded this far with the dismantling of your engine you have enough parts exposed and material open for the average maintenance personnel to start checking and repairing, without interfering with one another's work. In doing this work, remember that you are trying to accomplish certain things: First, a thorough workmanlike job of inspection; secondly, you are securing accurate

data on the condition of your unit; thirdly, reconditioning as it should be to give you the best and most efficient performance. All of these operations should be done in the least possible time for outage and still accomplish the desired results. Thus, the explanation for this general dismantling of your unit up to this point. The balance of the work on the engine can be completed after these parts are reassembled and will follow in sequence.

The above, of course, is a general method of procedure which can be varied by those supervising the work as they deem best. One most important item should be kept in mind: A complete record of inspection findings and data should be recorded for future reference. If you have a factory engineer supervising the work, he will, through his experience and training, record all these data. If those in charge of the plant are supervising the work, however, they should be very careful to see that each operation is noted and supervised in order that unintentional errors are not made by workmen who are not completely familiar with the various steps involved in dismantling, reconditioning, and reassembly.

The various steps of checking and reconditioning and the data obtained will be carried on in the next issue of DIESEL PROGRESS, so that when this subject is completed you will have a complete story covering, in a general way, the subject involved.

## R.E.A. ON GUARD

IN a signed editorial in the current issue of *Rural Electrification News,* Administrator Harry Slattery warned rural leaders that ". . . unless we do something about the present, there will be no future." The country needs, he said, ". . . munitions of war, food, and a National determination to work, to sacrifice, and to endure despite the cost. . . . Shortages


THE WRIGHT WAY TO SPEED PRODUCTION

WRIGHT *Improved High Speed* HOISTS
¼ TO 50 TONS

● *FASTER, ever faster* production is demanded of American industry. One tool that will help speed up your production is the Wright Improved High Speed Hoist.

Wright Hoists are engineered for *fast,* high speed work. Their action is smooth and positive—because of their correct load wheel and driving spindle bearings. They are also *safe* and *economical.*

Ruggedly constructed on precision design, Wright Hoists give you long-time trouble-free service.

As with all ACCO products, safety is an in-built feature. The load chain has a safety factor of 7 to 1. It is made of a special process steel which permits the chain to elongate (under overload) 3" to the foot before breaking. This same visual factor of safety is inherent in the bottom hook which will slowly open to indicate overload beyond the elastic limit of the chain.

WRIGHT TROLLEYS are made to give the same *fast, economical, safe* service as WRIGHT HOISTS.

WRIGHT MANUFACTURING DIVISION
YORK, PENNSYLVANIA

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.
*In Business for Your Safety*

## CUT FUEL and OIL WASTE!

● It is well known that there is a residue from the fuels and oils we use—gums, carbon and sludge that cause rings to stick and pistons to freeze.

There is a time-proven way to keep your engines running for longer periods—keep them cleaner, more efficient—and reduce "time-out" for service and maintenance costs . . . RISLONE is doing this for thousands of diesel engine operators.

RISLONE, "The Oil Alloy," is a combination of little known chemicals designed to ABSORB all types of gums. RISLONE thus frees sticking valves and rings. By adding it to the regular oil right in the sump or pressure lubricators it prevents gum formations and cuts down on the "time-out" for ring and valve servicing.

RISLONE improves lubrication, reduces friction and wear,—keeps compression up and the engine cleaner. And a cleaner engine means less fuel and oil consumption—less waste.

Rislone is available throughout the U. S. A. and Canada—in 1½ qt. cans and in 5, 15, 30 and 50 gallon drums.

You'll be interested in our 64-page book "Engine Performance," a copy of which will be mailed on request.

**THE SHALER COMPANY**
**Waupun, Wisconsin and Toronto, Ont., Canada**

SHALER
RISLONE

have developed and will continue to develop. Our line-construction program will be curtailed. If any copper is available after munitions needs are met, REA will get it. But we can have no hesitancy in deciding when we must choose between farm electric lines and shell cases."

Another article in the same issue calls attention to renewed activities by private power companies against farmers' efforts to get co-operative electricity. The article, titled "Power Companies Renew Offensive," says: "After a period of relative quiet lasting many months, farmers desiring electric service are finding their efforts hampered by familiar anti-REA propaganda. Manifestations of this condition have appeared in a great many places throughout the country, giving rise to the belief that they may be parts of a coordinated campaign of opposition."

The article then cites specific instances of power-company opposition in New York, West Virginia, Minnesota, and Oklahoma. It concludes: "The post-war transition from an all-out defense effort to a new economy making extensive use of decentralized industrial activities offers a plum worth fighting for and, apparently, the private utilities have no intention of permitting power users to have any share of it."

### TUNA CLIPPER "ANNA M."

. . . . *Continued from page 41* . . . .

chain locker is in the upper forepeak, followed by culinary stores and two ice boxes for meat and vegetables. Aft of the machinery flat, which is really an open U-shaped gallery around the engine room, is the large galley with all modern conveniences including oil fired range, air ventilating blower, electric sink and large ice box. Above this main deck are crew's quarters for a total of fifteen men, divided into two separate groups. On this deck forward is the net locker, crew's quarters for eight, wireless room and bunks for two operators, and crew's quarters for four, all on the starboard side. On the port side, from fore to aft, is the steering gear room, lavatory and shower, Captain's quarters with separate lavatory and shower. On the bridge deck is the pilot house and chart room, followed by the sounding machine room, chapel and customs locker. All rooms on this deck level have plate glass windows in their partitions, which enables the Captain to see entirely aft without going outside on deck, and to watch the customs locker for pilferers of beverages and ciga-

rettes stowed aboard tax free for ships sailing the high seas. The beautiful chapel is a model for fishing vessels.

Next to the refrigeration machinery, the special equipment is most interesting. A 400 watt shortwave Mackay radio; a Sargent direction finder; a Photoelectric Pilot Co.'s Navy type automatic steerer and power steerer; Scott searchlight; Cunningham whistle; 7 bottle $CO_2$ fire fighting system; Kingsbury Thrust Bearing on main drive shaft; Tungar battery charger for direction finder; a No. 710 Fathometer installation; and a 3-bladed 71″ x 39″ Coolidge propeller are all part of the elaborate equipment. A bronze and ironbark rudder is fitted for easy repair in tropic waters.

The elaborate system of handling and preservation of fish will permit the *Anna M.* to go safely as far south as the Galapagos Islands. The fish are caught and dropped into a tank with circulating chilled seawater, which cleans them and brings them down to about 33 degrees F. Then the tank is drained and clean seawater and a heavy addition of rock salt is added, and the temperature brought down to about 6 deg. F., at which time the fish are frozen as hard as a plank. This dense brine is pumped off and the fish stored dry in the chilled de-watered tank until taken out at the shore receiving station, from 3 to 8 weeks later. So, it is obvious that *Anna M.* is worth the $180,000 she cost, and is a credit to the Diesel, fishing and shipbuilding industry.

★ ★ ★

THE Panama Canal General Purchasing Office at Washington, D. C., has received bids for the construction of a new Diesel ferry boat, or the furnishing of a second-hand ferry boat. A figure of $363,500 was submitted by the Saxton Company at 80 Wall Street, N. Y.

★ ★ ★

ELECTRIC Ferries, Inc., New York, has awarded a contract to the General Ship & Engine Co., East Boston, Mass., for the construction of a Diesel-electric ferryboat designed by Eads Johnson, naval architect, of New York. This ferry is to be similar to the vessels of this type previously built at the same yard. Dimensions are 185 feet in length, 45 foot beam, and 15 feet deep and the boat to be equipped with General Motors Diesel engines developing 950 horsepower.


On the "T. W. DRENNEN"

MODERN Electrical R.P.M. INDICATION in both pilot house and engine room

Smooth, accurate RPM readings have been made available for both the pilot and engineer on the new "T. W. Drennen", by using the simple, electrical method. *Just one engine-mounted magneto, with two indicators quickly and easily wired to it.* And because of the absence of shafting and other mechanical parts, all readings will be *sure* . . . and maintenance will be kept *'way down.* Let us send you all the facts on WESTON Electrical Tachometers. Write to . . . Weston Electrical Instrument Corporation, 579 Frelingsen Avenue, Newark, N. J.

WITH . .

WESTON Electrical TACHOMETERS

FOR CYLINDER TEMPERATURES . . COOLING LINES . . EXHAUST LINES

THE All-Metal THERMOMETER

simplifies installation—provides convenient readability—cuts maintenance 'way down

All-metal thermometers provide the advantage and convenience of direct temperature readings at each critical location. Easily mounted because no capillary or leads are required. Simplified all-metal construction resists breakage . . . safeguards the thermometer against damage or inaccuracies from over-ranging . . . and provides dependable service over longer periods. Guaranteed accurate within 1% over the entire scale. Available in types and sizes for all diesel applications. Descriptive literature gladly sent on request. Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark, New Jersey.

WESTON ALL-METAL THERMOMETERS

## NEW SLEEVE BEARING HANDBOOK

A NEW "Handbook of Sleeve Bearings", by Albert B. Willi, has just been published by Federal-Mogul Corporation. So far as we know, this is the only work of it kind ever produced.

Briefly, the book discusses the effect of design, alloys, and manufacturing methods upon sleeve bearing efficiency, and defines the field of application for each basic type of sleeve bearing. It contains information which, based on experience, engineers, designers, and draftsmen will welcome as a constant guide to bearing design and selection.

One of its most valuable uses will be as a reference, particularly to that section which lists innumerable sizes and types of bearings and bushings for which major manufacturing tools are now available.

This will make it possible for engineers and designers to obtain custom built bearings for a new or improved application without paying the premium this ordinarily entails. In many cases, the major tools will already be available and the bearing or bushing will be produced with only minor costs for incidental tooling.

The "Handbook of Sleeve Bearings" is the result of long years of specialization in this field and the job of gathering this information between two covers has in itself taken several years. This handbook has been produced only at considerable cost and can be made available only to those readers of DIESEL PROGRESS who are directly concerned with sleeve bearing installations.

★ ★ ★

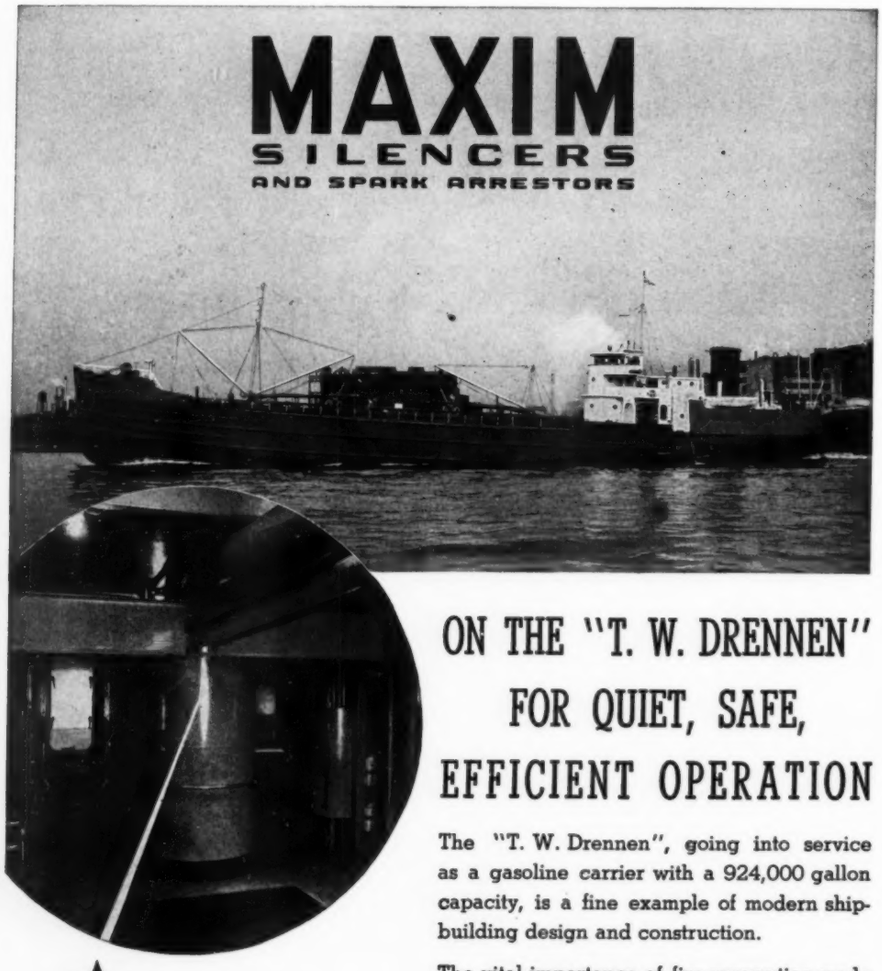
THE Calumet Shipyard & Drydock Co., Chicago, Ill., has received a contract from the Ashland Oil Refining Company for the construction of five barges and one Diesel-propelled towboat. This towboat will be 375 gross tons, 140 feet in length, 31 foot beam, and 9 feet deep and is to be equipped with a 1600 hp. Diesel engine.

## WALTER A. PARRISH GOES TO NATIONAL SUPPLY

THE National Supply Company announces the appointment of Mr. Walter A. Parrish as Executive Engineer of the Superior Engine Division, with headquarters at the Springfield, Ohio, plant.

Mr. Parrish was born in Detroit, Michigan, and attended grade and high schools in that city, graduating from the Detroit Technical Institute in 1910. Since that time practically his entire work has been with internal combustion engines, and his service record is replete with names of companies famous in automobile history—Ford, Hudson, Maxwell, Lozier, Continental Engine, Packard, and others. While with Hudson, he was associated with Howard E. Coffin, one of the immortals in automotive design; with Packard he did special work with E. H. Belden on their famous 12-cylinder racing car engine, as well as service engineering and in the truck division. In 1916, he was in service on the Mexican border with the 31st Michigan Infantry; after his return he was with the International Harvester Experimental Works at Chicago, later being transferred to the Truck Plant in Akron where he was Chief Draftsman.

From 1919 until 1922, he was Chief Engineer for the Akron Motor Truck Company, where


ON THE "T. W. DRENNEN" FOR QUIET, SAFE, EFFICIENT OPERATION

The "T. W. Drennen", going into service as a gasoline carrier with a 924,000 gallon capacity, is a fine example of modern shipbuilding design and construction.

The vital importance of fire prevention made 100% spark arresting absolutely essential, and Maxim Spark Arrestor Silencers a natural choice for this critical installation.

On your boat, too, Maxims will insure safe, quiet, efficient operation. Write for details.

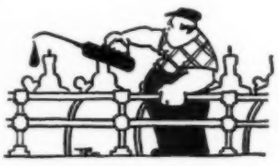
★ Showing Maxim #36 MUA Intake Silencer on 1225 h.p. Fairbanks-Morse Diesel. Exhaust Spark Arrestor Silencer on the same engine is a #48 Maxim Model SCF — Fairbanks-Morse auxiliary generating set, carries a #10 SCF Maxim Spark Arrestor Silencer.

THE MAXIM SILENCER COMPANY
94 HOMESTEAD AVE. ★ HARTFORD, CONN.

he was responsible for one of the earliest developments of a high-speed, 1½ ton truck running on pneumatic tires. In 1922, he joined Hercules Motors Corporation at Canton as Engine Designer, and, in 1927, went to White Motors at Cleveland in the same capacity.

For ten years he was Engine Designer, Assistant Chief Engineer, and Chief Engineer for The Buda Engine Company at Harvey, Illinois, followed by one year with Caterpillar Tractor Company as Engine Designer.

In 1939, he joined the Cummins Engine Company at Columbus, Indiana, as Assistant Chief Engineer, serving in that capacity until his recent decision to accept this new position with the National Supply Company.



## HONAN-CRANE HOLDS ANNUAL SALES CONFERENCE

HONAN-Crane Corporation, manufacturers of Crane Oil Purification Equipmen', held its annual sales and engineering conference at the home office in Lebanon, Indiana, September 10, 11 and 12. Looking over the comprehensive program, we find ample evidence of Diesel consciousness in this progressive organization. Listed for discussion were such subjects as Lubricating and Fuel Oils; Diesel, Gas and Gasoline Engines; Power Plants; Industrial Plants and Marine installations; Detergent, Additive, Inhibited and Compounded Oils

The program was interspersed with recreational periods and banquets in sufficient quantity to assure well rounded refreshment of the confreres both mentally and physically.

THE U. S. Maritime Commission has received bids for the construction of six 185 ft. Diesel seagoing tugboats. The Commission will furnish, without cost to the contractor, the main propulsion engines, electric couplings, and reduction gears.

★ ★ ★

THE American Electric Welding Co., Inc., Baltimore, Md., has been awarded a contract by the U. S. Maritime Commission for one harbor tanker, 100 feet in length, 18 foot beam, and 9 feet deep, which is to be equipped with Diesel machinery.

★ ★ ★

THE Navy Department has awarded a contract to the National Supply Company, Springfield, Ohio, to furnish Diesel engines, the amount for which will be $87,973, and to the Atlas Imperial Diesel Engine Co. of Chicago, Ill., in the amount of $77,000.

**you TELL 'em**

**but how can they KNOW?**

Billions of dollars have been spent in lubricating engineering . . . billions of words have been written on lubrication importance. Engine manufacturers go to great lengths *telling* their customers that adequate lubrication is the most important single factor for efficient operation and engine protection. Yet many still persist in sacrificing the product of their engineering skill on the block of "operating lubrication ignorance" because they fail to provide the operator with any means of *knowing*.

Those manufacturers who recognize the importance of *knowing by seeing*, made the VISCO-METER* a part of their engines and have been rewarded thru increased sales and profits. *We have the facts.*

To a few more manufacturers who are alert to the necessity of *completing* the lubricating system of their engines—who are ready to take the "blindfold" off lubrication worries merely by the inclusion of a simple, accurate, service-proven, inexpensive instrument—we offer the VISCO-METER*.

The obviousness of its importance and the simplicity of its automatic function in *constantly showing* the lubricating quality of crank case oil warrants every engineer's investigation of the VISCO-METER*.

Without obligation a Visco-Meter Corporation executive will come to your plant, fully explain the purpose and operation of the VISCO-METER* and convincingly demonstrate the added advantages VISCO-METER* offers as a feature of your engines. Address your letter to the Visco-Meter Corporation, Grote Street, Buffalo, New York.

**VISCO-METER**

**CORPORATION GROTE ST., BUFFALO, N. Y.**

**Fully covered by U. S. and Foreign Patents*

## ADVANCED TO CATERPILLAR PRESIDENCY

LOUIS B. Neumiller, who began his association with Caterpillar Tractor Co. of Peoria, Illinois twenty-six years ago as a stenographer and blue print clerk in the engineering department, has been elected president of the Company by the Board of Directors. Mr. Neumiller succeeds B. C. Heacock, president since 1930, who becomes chairman of the Executive Committee.

The new president of Caterpillar Tractor Co. is a native Peorian, educated in his city's schools. The story of his rapid ascent in the Company ranks is a shining example of the American way of life and the opportunities it offers one with ability, ambition and courage.

Simultaneous with the advent of Caterpillar Diesel Engines in 1931, Mr. Neumiller was advanced to general service manager. He became sales manager for the central division in 1937, director of industrial relations six months la and was appointed a vice president of Company five months after that. As vice pr dent, a position he held until elevation to presidency, Mr. Neumiller was in charge of service, parts, industrial relations and train and public relations departments.

*Louis B. Neumiller*

Mr. Neumiller was born in Peoria, January 1896. He married Miss Selma Engstrom McPherson, Kansas in 1930 and is the fat of three girls, Martha, Mary Louise, and A Marie.

Mr. Heacock, who becomes chairman of t Executive Committee, succeeds R. C. Fo who resigned as committee head, but rema a member of the board. Mr. Heacock will h headquarters in Peoria, although at present time and attention are occupied in Washing D. C., where he went last spring on a leave absence to serve as special assistant to Und Secretary of War Robert Patterson.

## MAGNETIC CLUTCH AND BRAKE BULLETIN

A NEW twenty-page catalog on the subj of magnetic clutches and magnetic clutch brake combinations, designated as bulletin 225-A, has been issued by the Stearns M netic Mfg. Co., Milwaukee, which has exten engineering facilities for the design and ma facture of magnetic power transmission devi including brakes.

The new catalog contains a wealth of en neering data on the application of magn friction devices, with dimension drawin tables of specifications, and pictures of ins lations showing the ready adaptability of m netic clutches and clutch-brake units for m or remote control in industrial use.

FASTER THAN STEAM
TWICE AS FAR
FOR HALF AS MUCH
TO MAKE A
LONG STORY SHORT
It is a long story . . . this proved performance record of Cummins Dependable Diesels in more than 300,000,000 miles of heavy-duty truck service . . . in the millions of hours in oil well drilling, logging, road construction, fishing boat, tow boat and countless other types of industrial and marine power installations. It's a record that—for variety of application and consistent economy and dependability—no other diesel in America can equal! Cummins Engine Company, Columbus, Indiana.
CHEAP LOGS
POWERED FOR PROFIT
FOR PLEASURE
OR PROFIT
CUMMINS
Dependable
DIESELS

CONTRACTS have been placed with five shipyards for the construction of twenty-two Diesel tugboats, details for which have not been announced as yet, by the United States Maritime Commission. The shipyards with the number of boats to be built by each are given below:

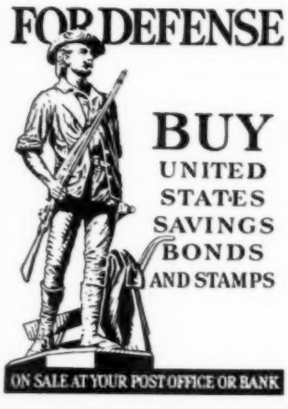
General Ship & Engine Co., East Boston, Mass., two tugs, hulls 461 and 462.

Ira S. Bushey & Sons, Brooklyn, N. Y., five tugs, hulls 447 to 451.

Calumet Shipyard & Drydock Co., Chicago, Ill., five tugs, hulls 442 to 446.

Canulette Shipbuilding Co., Inc., Slidell, La., four tugs, hulls 438 to 441.

Birchfield Boiler Co., Tacoma, Washington, six tugs, hulls 432 to 437.




## C. DOLAN ELECTED AVIATION CHIEF OF CHICAGO PNEUMATIC

APPOINTMENT of Chas. H. Dolan, well known executive of thirty years' experience in aviation industry, as General Manager of the newly formed Aviation Division of Chicago Pneumatic Tool Company is announced by H. Arnold Jackson, President, at the company's head office at 6 East 44th Street, New York.

Mr. Dolan, pilot in the World War Lafayette Escadrille and former vice-president of operations of Eastern Air Transport, Inc., will be in charge of all aviation equipment production and development at the recently acquired plant at Garfield, N. J. Initial operations of the aviation division will be the manufacture of hydraulic cylinders for operating landing flaps, bomb bay doors, and other mechanisms on the Martin B26-B twin-engined bombers. Mr. Dolan will make his headquarters at Garfield.

## WEST COAST NEWS

FAIRBANKS-MORSE Diesels will power new 75-ft. tuna clipper under construction by Hollinger and Millican, San Diego, California, for Anthony Bregante. Main engine is of 240 hp.; auxiliaries two 60 hp. generator sets.

★ ★ ★

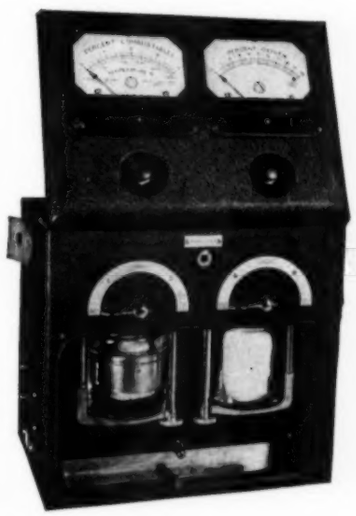
A SUPERIOR 465 hp. Diesel is the main power plant in the 135-ft. tuna clipper nearing completion in the Martinolich Shipbuilding Co.'s plant at San Diego, California, for Manuael Medina.

★ ★ ★

ATLAS IMPERIAL Diesels have been selected three widely different jobs: 300 hp. for the repowering of the *"Crowley No. 21,"* San Francisco Bay; 400 hp. for new tug under construction at Fulton Shipyards, Antioch, California; twin 135 hp. in the ex-*"Ora Elwell"* of the Skagit Towing Co., Everett, Washington.


Users of

# CITIES SERVICE LUBRICANTS get an EXTRA ADVANTAGE!



Heat-Prover Service is now available to users of Cities Service Industrial Fuels and Lubricants. This is an economy measuring service which you can secure in addition to the quality and economy advantages offered by Cities Service's SERVICE PROVED Fuel and Diesel Oils.

The Heat-Prover is an ingenious device—a by-product of our research in metallurgy. It registers continuously and instantaneously changes in the amount of oxygen and combustibles in furnace gases. It is an excellent guide in adjusting 4-cycle Diesels and for combustion control in heat generating plants. In the heat treatment of metals, it is invaluable. It assures uniformity and reduces scrap losses.

Let us tell you how you can secure the use of one of these machines. Mail the coupon today.

CITIES SERVICE OILS
ONCE-ALWAYS
DIESEL
LUBRICANTS

FREE
JUST
CLIP
AND
MAIL

CITIES SERVICE OIL COMPANY
ROOM 1326, SIXTY WALL TOWER, NEW YORK

Please tell me how I can get Heat-Prover Service in my shop. D. P.

Name .....

Name of Shop .....

Address .....

City ..... State .....

ANOTHER towboat to get a lease on life by repowering is the 53-ft. *"Cricket"* of the Columbia Contract Co., Portland, Oregon, with a 160 hp. supercharged Murphy Diesel, Twin Disch Clutch and Fairbanks-Morse pumps.

★ ★ ★

GRAY Diesels are increasing in popularity in British Columbia, Canada. Latest installations reported are 110 hp. in Harrison Lake Transportation Co.'s water taxi on Harrison Lake, and an 85 hp. in the cannery tender *"Seymour Beauty"* of Vancouver.

★ ★ ★

ANOTHER Canadian Northwest Diesel installation reported is a 120 hp. Vivian with Bendix clutch in the 60-ft. seiner *Manhattan No. 2* built for George Hilliar by Tofino Machine Shop, Vancouver Island, B. C.

★ ★ ★

THE former Puget Sound steam packet *"Mohawk"* has been repowered with 8 cylinder, 12 x 15 supercharged Enterprise Diesel by her new owners, the Upper Columbia River Towing Co. The job was handled by Fred Bitte's Floating Marine Ways, Portland, Oregon.

★ ★ ★

THE Columbia River cannery tender *"Papco"* constructed by the Astoria Marine Construction Co., for the Point Adams Packing Co., Hammond, Oregon, is powered with a 90 hp., Superior Diesel with 2 to 1 reduction gears driving the 52-ft. vessel 12 mph.

★ ★ ★

A HERCULES Diesel engine has been selected for the repowering of the 50-ft. converted water taxi now rebuilding at Madden and Lewis yard at Sausalito, California, for Peterson's Water Taxi Co., of San Francisco.

★ ★ ★

HONOLULU, H. I., gets two Young Brothers' craft with Fairbanks-Morse Diesels; a new oil barge built by Bethlehem Shipyards, San Francisco, with two 60 hp. engines driving pumps, a 30 hp. generating unit and a 10 hp. auxiliary. The tender *"Pilot"* also acquired a 60 hp. engine.

★ ★ ★

*"DOROTHY LEE,"* 75-ft. fishing vessel recently completed by Hollinger and Millican, San Diego, for Frank Medina and associates is powered with a 200 hp. Fairbanks-Morse Diesel, and a 15 hp. Fairbanks-Morse auxiliary. All pumps are also Fairbanks-Morse.

★ ★ ★

CATERPILLAR Diesel engine sales include two 55 hp. generating sets installed in the new tuna clipper for Frank Medina, San Diego, a a 55 hp. propulsion engine for new pleas craft under construction by Guerin Bros., So San Francisco.

★ ★ ★

WASHINGTON Diesels have been s lected to power two towboats now under co struction at Terminal Island, California, Monty Ward for breakwater construction se ice Long Beach, Los Angeles Harbor. T auxiliaries will be Superior Diesels.

★ ★ ★

THE Hodgeson Shipyard, Long Beach, C fornia, has started framing the second of th tuna clippers at their new West Seventh Str plant. This vessel will be Superior Diesel p pelled, both main and auxiliaries of this ma having been selected by the owners.

## NEW BOOK DESCRIBES PLAN DISTRIBUTION SYSTEM

FOR use in industrial plants and power s tions, radial and secondary network distributi systems are described in a 77-page book a nounced by Westinghouse Electric and Ma facturing Company.

Covering everything from substations a switchgear to small auxiliary equipment, t

NUGENT *DUPLEX* FILTER Keeps Fuel O Clean for Main Engine aboard "T. W. DRENNEN"

● The new tanker "T. W. DRENNEN" symbolizes one of the most modern motorships of its type ev to come off the ways. Designers and engineers have taken steps to make sure that all equipme aboard is of the latest design, to provide complete dependability. To protect the Fairbanks-Mors main propulsion Diesel engine against fuel oil "dirt troubles," a Nugent Duplex Filter has been installe as illustrated at the left. With this modern filter in operation, operators can rest assured that di particles as small as .0003" will be removed, to provide 99-8/10% clean fuel oil. Write for informatio and literature.

**Wm. W. Nugent & Co., Inc. Mfrs.**

Oil Filters, Oiling and Filtering Systems, Telescopic Oilers, Oiling Devices Sight Feed Valves, Flow Indicators, Compression Union Fittings, Oil Pumps, Etc.

415 N. HERMITAGE AVE. Established 1897 CHICAGO, U. S. A.

book is probably the most comprehensive of any yet published on this subject.

Divided into four parts, the scope of the book covers radial systems, banked transformer system, plant network systems, and associated electrical apparatus. In all cases typical applications and specifications for standardized units of equipment are described in detail. Assembly drawings show position of parts, give ratings and physical dimensions of the principle items. Copies of this book may be had by writing to Mr. R. G. Redhead, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

## NEW DIESEL BOOK BY FAIRBANKS-MORSE

"MODERN Installations By America's Largest Builders of Heavy Duty Diesels" is the somewhat lengthy title of a new and attractive 80-page booklet received recently from Fairbanks, Morse & Co., Diesel Division. The booklet is largely pictorial in nature, illustrating in a most pleasing manner a galaxy of Fairbanks-Morse stationary Diesel installations in both municipal and industrial plants. Brief captions describing the many photographs list the equipment used and the typical annual earnings resultant.

For those municipal or industrial executives contemplating the use of Diesel engines, it offers a quick resume of the merits of this type of prime-mover. One feature of the book is a map of the United States on which are located the many hundreds of Fairbanks-Morse publicly owned Diesel installations.

A copy of the new book may be had by writing the company's headquarters' office, 600 S. Michigan Ave., Chicago, Ill., on a company or municipal letterhead.

## NEW BULLETIN ON TEXROPE SHEAVES

FULL descriptions of Allis-Chalmers Texsteel and Texdrive Sheaves—steel and cast iron sheaves for Texrope Drives from fractional to 25 horsepower—are presented in new bulletin B-6047 just issued by the Allis-Chalmers Manufacturing Company.

Both types of sheaves are widely used throughout industry. The Duro-Brace Texsteel Sheave is the lightest heavy-duty sheave on the market. True-Groove Texdrive Sheaves are designed for rigidity against shocks, providing a smooth, vibrationless flow of power.

Handy tables in the book list available sizes, various dimensions and list prices. A section is also devoted to the new Texrope Super-7 V-belts.

## NEW MODEL EVAPORATIVE COOLERS ANNOUNCED BY FAIRBANKS, MORSE & CO.

THE demand for Diesel engine jacket water coolers of low purchase cost plus low operating cost has resulted in Fairbanks, Morse & Company's announcing new and improved models of evaporative coolers using the principle of heat dissipation by evaporation of water.

This device, considered to be the most economical so far developed, consists essentially of a coil through which the jacket water is passed,

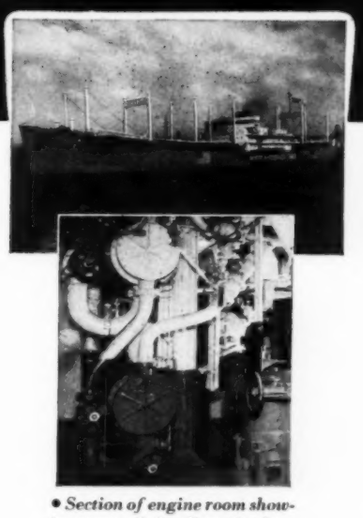
81%
OF AMERICA'S DIESEL ENGINE BUILDERS PURCHASE ROSS COOLERS

. . . and on the Diesel Ship MORMACPENN*
ROSS Coolers were specified for Busch-Sulzer Engines

WRITE FOR BULLETINS 4922 and 3622

On the combined passenger and cargo Diesel ship MORMACPENN*, Ross Type "CP" Coolers were installed for both the lube oil and jacket water cooling systems.

*Original C-3 vessel recently purchased by the Navy as an auxiliary ship, and now operating under a new name.



• *Section of engine room showing two of the Ross Coolers.*

DIVISION OF AMERICAN RADIATOR & Standard Sanitary CORPORATION
ROSS HEATER & MFG. COMPANY, INC.
WEST AVENUE NEAR FOREST • BUFFALO, NEW YORK

nozzles to spray water on the coil, and a blower to force air past the coils. In operation, the hot jacket water enters the cooling coil at the top of the cooler, water from the reservoir at bottom of unit is sprayed over the coil from one end, and air is blown in from other end.

The cooling process is the result of the water spray over the outside coil in the opposite direction to the flow of induced air. The heat of the jacket water is absorbed by the air through direct transfer and by evaporation of water on the coil surface. After being cooled, the jacket water is then returned to the engine. The spray water is constantly recirculated so that the active amount consumed is only about two lbs. per 1000 Btu. of engine heat absorbed.

Units are available which cool the engine lubricating oil in a separate coil within the same cooler as the jacket water. This simplifies piping and saves space. Three types of coolers are also built by the manufacturer, completely automatic, semi-automatic and manual.

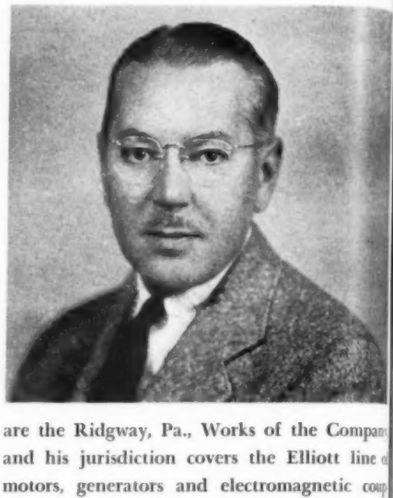
The cooler is designed primarily for indoor operation although units for outdoor installation may be secured with cooling coils of the finned type to permit air cooled operation throughout the winter season. The finned type coolers may also be used indoors in winter season to heat occupied spaces through branch lines of the air discharge duct.

Jacket water cooling of Diesel and gas engines is only one use to which these coolers are adapted, according to the manufacturer. They are also being used for general water cooling in chemical plants, oil refineries, steel plants, paper manufacturing, etc.; for refrigerant condensing in air conditioning, milk plants, ice plants, breweries, packing plants, and the like, and for miscellaneous cooling such as transformer cooling, broadcasting tube cooling.

A new Bulletin FECD-2 profusely illustrating and completely describing the coolers may be had by writing the company's headquarter office, 600 S. Michigan Ave., Chicago, Illinois.

### H. S. PAHREN

ON September 1, H. S. Pahren became manager of the Electric Power Sales Department of Elliott Company. His headquarters



are the Ridgway, Pa., Works of the Company and his jurisdiction covers the Elliott line of motors, generators and electromagnetic couplings. Mr. Pahren has had a well rounded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training and experience. He attended public school in his home town, Cincinnati. He went to the University of Cincinnati as the first Westinghouse War Memorial scholar, graduating as electrical engineer. While at the University, he was also employed in the electric meter laboratory of the Union Gas & Electric Company. Upon graduation he went with Westinghouse Electric & Manufacturing Company, working at East Pittsburgh, Sharon, Derry, and South Philadelphia Works. He was then sent to the Cincinnati and, later, to the Indianapolis office of Westinghouse, after which he was moved to Dayton, Ohio, as sales engineer in the central station division of that office. Later he was employed as electrical engineer in the Department of Public Utilities of the City of Cincinnati under the present director, Edgar Darrel Gilman. He came with the Elliott Company in 1928 and has been located in the Kansas City, Omaha, Tulsa, and St. Louis offices. He had been district manager in St. Louis since 1936.

# Latest Diesel Patents

*A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.*

*Conducted by* C. CALVERT HINES*

2,199,706

INTERNAL COMBUSTION ENGINE

Marion Mallory, Detroit, Mich.

Application November 18, 1937, Serial No. 175,318

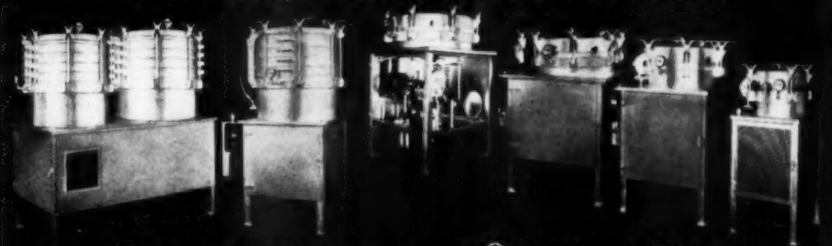
1 Claim. (Cl. 123—33)

An internal combustion engine comprising a cylinder, a piston reciprocable therein, (a main combustion chamber, an injection pocket having a restricted communication with the main combustion chamber, means for injecting fuel into the injection pocket, a primary combustion pocket having a restricted communication with the injection pocket, electrical ignition means

* Patent Attorney, 811 E Street, N.W., Washington, D. C.


HILCO *Oil Reclaimers*

COMPLETE—COMPACT—CONTINUOUS



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- HILCOS are being direct-connected to one or more engines for continuous or intermittent by-pass purifying to remove contamination as it is formed.
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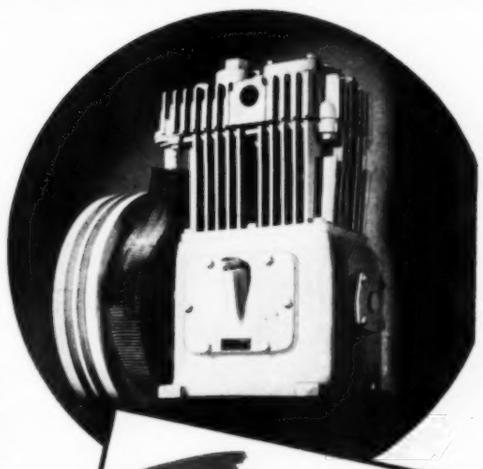

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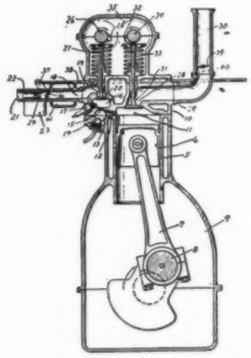
for said primary combustion pocket, a valve controlled port at the top of said primary combustion pocket, means including a carbureter for delivering a carburetted combustible mixture of air and fuel through said intake port



into the primary combustion pocket, and a valve controlled air inlet for the main combustion chamber, the said valve controlled port for the primary combustion pocket being open on the suction stroke of the piston whereby the exhaust gases in the primary combustion pocket and injection pocket are drawn out of the said pockets on the intake stroke and a fresh charge of fuel and air drawn into the primary combustion chamber.

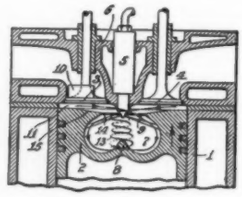
2,205,493

## INJECTION INTERNAL COMBUSTION ENGINE

Hippolyt Saurer, deceased, late of Arbon, Switzerland, by Rosina Saurer-Begner and Anita Elisabeth Saurer, sole heirs, Arbon, Switzerland, assignors to Societe Anonyme Adolphe Saurer, Arbon, Switzerland, a corporation of Switzerland

Application October 16, 1937, Serial No. 169,406. In Germany April 22, 1937

1 Claim. (Cl. 123—32)



In a direct injection internal combustion engine having a cylinder, a piston adapted to operate within said cylinder, a toroidal chamber located in the upper portion of said piston having a restricted entrance leading thereto through the top of said piston, a protuberance substantially centrally located of said piston head extending upwardly from the bottom of the said chamber, a nozzle located in said cylinder by which fuel is radially sprayed against the walls of the toroidal chamber in downwardly diverging jets, the walls of the said toroidal chamber being curved from the restricted entrance outwardly downwardly and inwardly toward the centrally located protuberance, the annular area of the piston top being beveled downwardly toward the axis in the form of the surface of a truncated cone, means for controlling the admission of air into said cylinder, whereby the air is tangentially whirled above the head of said piston and directed into the toroidal chamber by reason of the beveled piston top against the walls thereof and is axially whirled at high velocity upwardly around the protuberance from the bottom of the chamber.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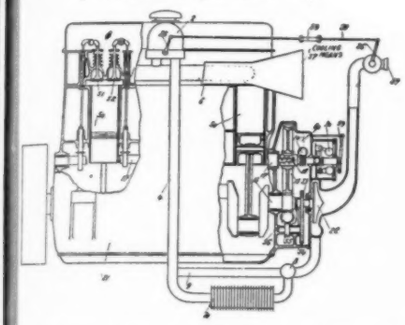
KIRKEBY
HOTELS

2,195,082

## TWO-STAGE-COMPRESSION INTERNAL COMBUSTION ENGINE

Paul Dugelay, Paris, France, assignor to Societe d'Exploitation de Brevets pour l'Industrie l'Aviation et l'Automobile (Sebia), Paris, France, a corporation of France

Application June 22, 1935, Serial No. 27,927
In France June 25, 1934
17 Claims. (Cl. 123—119)



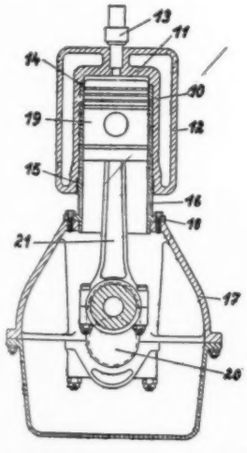
1. In an internal combustion engine, the combination, with a plurality of piston cylinders, an admission manifold common to all of said cylinders, and a compressor connected to deliver under pressure into said manifold, of an admission valve to each of said cylinders having a delayed closing characteristic so as to transfer the charge from one cylinder into another under the pressure obtaining in said manifold and during a considerable portion of the suction stroke of the cylinder receiving said transferred charge, and means for forming the combustible fuel mixture, said means being arranged in a closed space in series between said compressor and the said manifold for the purpose of feeding each cylinder of the engine with said charge during the transfer period.

2,202,643

## INTERNAL COMBUSTION ENGINE

Arthur Berger, Oberturkheim, near Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Application May 13, 1936, Serial No. 79,413
In Germany May 16, 1935
2 Claims. (Cl. 123—173)




2. In an internal combustion engine, the combination comprising a cylinder provided with an internal peripheral shoulder near its upper end and with an internal thread near its lower end, and a liner for said cylinder having an external thread near its lower end engaging said internal thread for pressing the other end of said liner against said shoulder,

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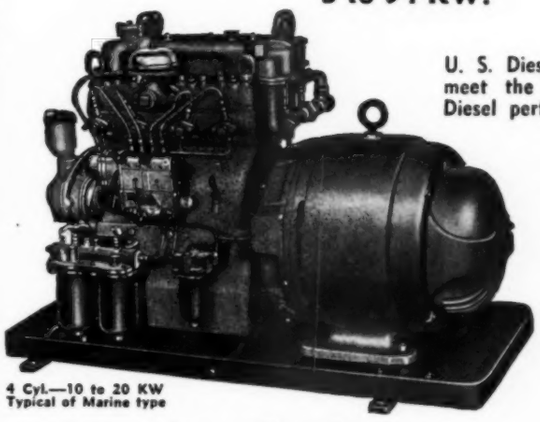

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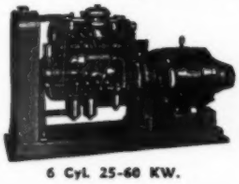
2 Cyl. 5, 7½, 10 KW.



6 Cyl. 25-60 KW.

94 KW.

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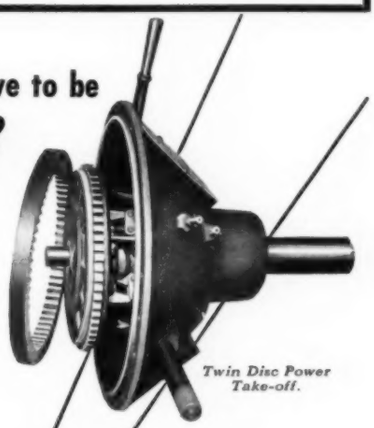

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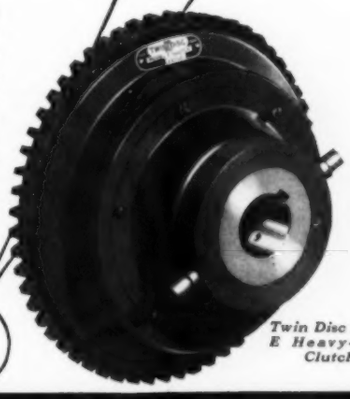

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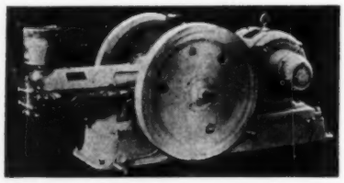

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the normal diameters of said cylinder and liner, and the normal lengths of the distances from said shoulder to said internal thread and from the abutting end of said liner to said external thread differing by amounts substantially equal to the relative expansion of said diameters and distances when said cylinder and liner are both heated from normal temperature to a temperature above the operating temperature of the engine, whereby upon contraction to ordinary operating temperature of the engine, the contacting cylinderical and annular surfaces will remain tightly pressed together.

2,181,286

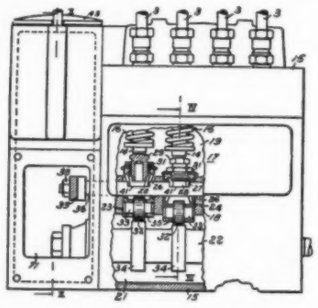
VACUUM RESPONSIVE GOVERNING MEANS FOR INTERNAL COMBUSTION ENGINES

Arthur F. Stern and Harvey W. Hanners, Milwaukee, Wis., assignors to Allis-Chalmers Manufacturing Company, Milwaukee, Wis., a corporation of Delaware

Application June 13, 1936, Serial No. 85,014

10 Claims. (Cl. 123—140)

1. In combination, an internal combustion engine regulator having a movable element and fuel feeding mechanism having a plurality of fuel feeding devices, means for actuating the fuel feeding devices to deliver charges of fuel



in a predetermined order, biasing means acting to maintain the fuel feeding devices operatively connected with the actuating means, and a movable control member cooperating with said fuel feeding devices and with said movable regulator element and operative when moved to vary the quantity of fuel delivered by the fuel feeding devices, said actuating means and fuel feeding devices being so correlated that a single fuel feeding device biasing means acts to restrain movement of the control member in the quantity reducing direction.

2,201,221

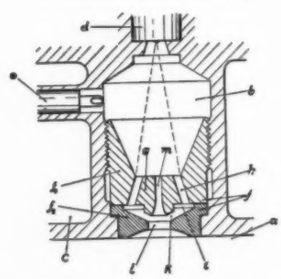
INTERNAL COMBUSTION ENGINE RECEIVING FUEL BY INJECTION

Alfred Bokemuller, Gaggenau, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Application March 30, 1935, Serial No. 13,965

In Germany April 4, 1934

2 Claims. (Cl. 123—33)



1. In an internal combustion engine receiving fuel by injection, in combination, a main combustion chamber, a precombustion chamber having a throttling opening therein for establishing communication between the interior of the precombustion chamber and the main com-

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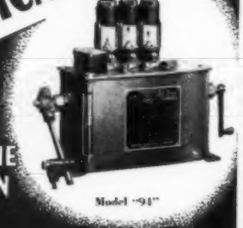

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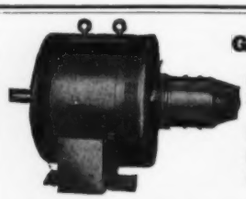

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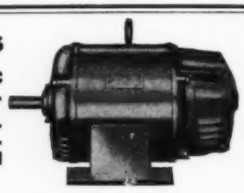
For all applications Stationary and Marine



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bustion chamber, a core piece arranged in the precombustion chamber on the side of said throttling opening remote from the main combustion chamber and having a restricted straight throttling bore therein for establishing communication between the precombustion chamber and said opening, a plurality of throttling conduits grouped around said core piece for establishing further communication between the precombustion chamber and said throttling opening and a fuel injection nozzle arranged to inject a jet of fuel through the precombustion chamber directly into said throttling bore and throttling conduits with the axis of the jet substantially in alignment with the axis of the throttling bore so as to allow fuel from the nozzle to pass in a straight line through the precombustion chamber, through said throttling bore and said throttling opening into the main combustion chamber, said throttling conduits having a bend therein so that the fuel injected into them can pass only through said throttling opening into the main combustion chamber after being subjected to a change in its direction of flow.

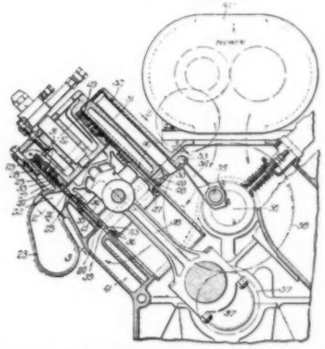
2,194,252

TWO CYCLE INTERNAL COMBUSTION ENGINE VALVE MECHANISM

Arthur A. Woodward, Detroit, Mich., assignor to Skinner Motors, Inc., Detroit, Mich., a corporation of Delaware

Application September 19, 1938, Serial No. 230,610

21 Claims. (Cl. 123—65)



1. In an internal-combustion engine of the type having an outer-cylinder with an exhaust port, an inner-cylinder inside of, concentric with, and spaced inwardly from, said outer-cylinder and terminating short of said exhaust-port, a piston reciprocatory in said inner-cylinder, a rotary-shaft, means operatively connecting said piston with said shaft, and means to seal the pressures in said cylinders beyond said piston including a longitudinally-split sealing-ring bearing on an end of said inner-cylinder,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having an exhaust-port in register with said outer-cylinder exhaust-port, and tending to expand, the incorporation of a unitary thin longitudinally-split cylindrical sleeve-valve between said outer-cylinder on the one hand and said inner-cylinder and said sealing-ring on the other hand, in combination with means to reciprocate said sleeve-valve lengthwise to open and to close said registered exhaust-ports.

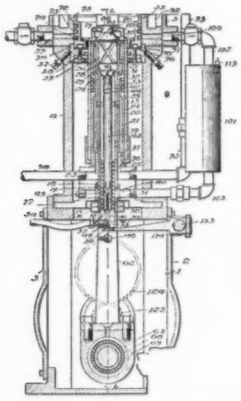
2,232,579

INTERNAL COMBUSTION ENGINE

Marcy L. Whitfield, deceased, late of Mount Gilead, Ohio, by Lellia L. Williams, administratrix, Mount Gilead, Ohio, assignor to Lellia L. Williams, Clearwater, Fla.

Application June 21, 1939, Serial No. 280,380

14 Claims. (Cl. 60—15)



5. An internal combustion engine comprising a stationary cylinder head, a cylinder reciprocable about said stationary cylinder head and with said stationary cylinder head forming a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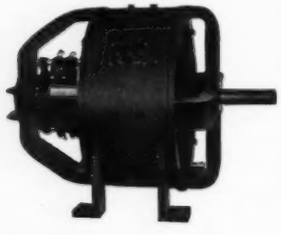

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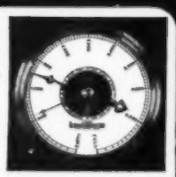

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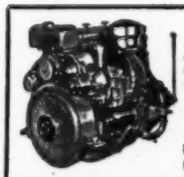

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combustion chamber, said stationary cylinder head including an outer tubular member, an inner tubular member substantially coaxially positioned within said outer tubular member, means for passing a constituent of a combustible mixture through said outer tubular member and about said inner tubular member into said combustion chamber, means for passing another constituent of the combustible mixture through said inner tubular member into said combustion chamber, means for controlling the passage of the constituent of the combustible mixture through said outer tubular member, means for controlling the passage of the other constituent of the combustible mixture through said inner tubular member, and means constantly tending to maintain the passage through said tubular members closed.

14. An internal combustion engine comprising a stationary cylinder head, a cylinder reciprocable about said stationary cylinder head and with said stationary cylinder head forming a high pressure combustion chamber into which constituents of a combustible mixture are introduced and in which combustion takes place and the products of combustion partially expand, a low pressure cylinder in tandem relation with respect to said high pressure cylinder in which further expansion of the products of combustion takes place, a piston reciprocable in said low pressure cylinder, means for introducing gases from the high pressure cylinder into said low pressure cylinder for further expansion, means for controlling the passage of gases from said high pressure cylinder to said low pressure cylinder, a water jacket next to said stationary cylinder head, a water jacket about said low pressure cylinder, a passage connecting said water jackets so that cooling water may flow serially through said water jackets, and means for directing water entering the water jacket next to said stationary cylinder head upwardly along one side thereof, around the top thereof and then downwardly along the opposite side thereof.


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2,206,594

## DIESEL FUEL


Henry G. Berger, Richard S. George, and Edwin M. Nygaard, Woodbury, N. J., assignors to Socony-Vacuum Oil Company, Incorporated, New York, N. Y., a corporation of New York



No Drawing. Application November 8, 1938, Serial No. 239,506
10 Claims. (Cl. 44—9)


1. An improved Diesel fuel comprising: a hydrocarbon fuel oil and in admixture therewith a minor proportion of hydrogen persulfides and elementary sulfur in an amount sufficient to decrease the ignition delay period of the fuel.

2,206,272

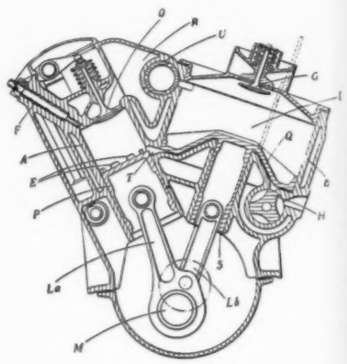
## INTERNAL COMBUSTION ENGINE


Charles Joseph Toth, Montevideo, Uruguay



Application November 5, 1936, Serial No. 109,384
In Great Britain November 26, 1935
3 Claims. (Cl. 60—15)


1. A two-stroke compound internal combustion engine comprising a high pressure cylinder, a low pressure cylinder with its axis inclined at an acute angle to the axis of the high pressure cylinder, said cylinders enclosing a receiver space in the angle between them, pistons reciprocable in the high pressure and low pressure cylinders, respectively, and connected to the same throw of a crankshaft, an inlet valve through which fluid is admitted for compression in the upper end of the low pressure cylinder, a valve through which the precompressed fluid is passed to a receiver, a valve through which the precompressed fluid is passed from the receiver to the upper end of the high pressure cylinders, means for causing the expansion of the fluid in this end of the high pressure cylinder, a transfer passage controlled by the high pressure piston through which the expanded fluid is transferred to the lower end of



the low pressure cylinder for a secondary expansion therein, and a valve controlling the exhaust of the fluid from the lower end of the low pressure clyinder.

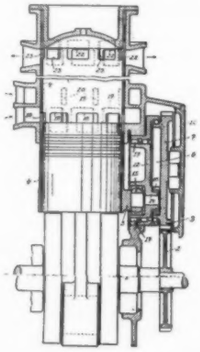
2,197,107

## TWO-STROKE CYCLE ENGINE


George Stephen Kammer, Geneva, Switzerland



Application February 21, 1939, Serial No. 257,744
In Germany December 3, 1938
5 Claims. (Cl. 123—65)

1. A two-stroke cycle internal combustion engine comprising a cylinder, a piston therein, a sleeve valve between the cylinder and the piston, exhaust and scavenge ports in the cylinder wall and in the valve, and separate supercharging ports in the cylinder wall alone, and means to reciprocate the sleeve valve in the axial direction and to oscillate it about its axis in timed relation with the engine crankshaft, the exhaust and scavenge ports being controlled by the axial movement of the valve and the supercharging port by the oscillating movement in combination with the piston movement.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